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NOTA LEPIDOPTEROLOGICA

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Manuscripts should be sent to the editor : Emmanuel de Bros, lic. jur., «La Fleurie», Rebgasse 28, CH-4102 Binningen/BL, Switzerland.

Instructions to authors

This journal is reserved for short communications devoted to Palaearctic lepidopterology. Manuscripts should not exceed 15 typed pages (including tables).

All manuscripts should be typed with double spacing and wide margins, and submitted together with at least one copy. All pages should be numbered and show the author's name at the top right-hand corner of each page. Do not hyphenate words at the right-hand margin. Current issues of Nota lepidopterologica should be checked for style and format.

Legends for figures and plates should be typed on a separate sheet and placed after the list of references. Line drawings should be about twice their final size. Black waterproof ink should be used. Photographs should be glossy positive prints. Colour plates can only be published at the author's expense.

Publication languages are english, french and german. The editors reserve the right to make minor textual corrections that do not alter the author's meaning.

All manuscripts exceeding three typed pages must include an abstract of no more than 100 words. It is strongly recommended to add a translation of the abstract in at least one of the other publication languages.

The first mention of any organism should include the full scientific name with the author and year of description. New descriptions must conform with the current edition of the International Code of Zoological Nomenclature. We strongly urge deposition of types in major museums, and all type depositions must be cited.

All papers will be read by the editors and submitted for review to two referees.

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Nota lepidopterologica

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Editor : Emmanuel Bros de Puechredon, alias de Bros, lic. jur., Rebgasse 28, CH-4102 Binningen BL, Schweiz.

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Contents – Inhalt – Sommaire

Editorial 2
An alle Mitglieder – A tous nos membres 4
R. Vis & H. A. Coene : Lepidopterological investigations in Cashmir and Ladakh (India) 5
G. Baldizzone : Contributions à la connaissance des Coleophoridae XLVI. Sur quelques Coléophores nouvelles ou peu connues d'Espagne et des Canaries 25
Z. Balint : Notes on *Plebicula dorylas magna* Balint, 1985 (Lepid. Lycaenidae) 49
P. Gyulai : Notes on the distribution of *Gortyna borelii lunata* Freyer in the Carpathian Basin 54
V. Cameron-Curry, G. Leigheb, E. Riboni and P. Cameron-Curry : Possible hybrids between *Lysandra bellargus* Rott. and *L. hispana* H.-S. (Lepid. Lycaenidae) 61
L. H. Dennis : Hilltopping as a mate location strategy in a Mediterranean population of *Lasiommata megera* (L.) (Lepid. Satyridae) 65
G. Derra : *Emmelina jezonica pseudojezonica* ssp. nov. (Lepid. Pterophoridae) 71
D. Povolny : *Scrobipalpa (Euscrobipalpa) dagmaris* sp. n. und andere interessante Entdeckungen bei den europäischen Gnorimoschemini (Lepid. Gelechiidae) 79
J. Razowski : A New Palaearctic Archipini genus (Lepid. Tortricidae) ... 87
Book Reviews – Buchbesprechungen – Analyses 53, 60, 70, 92

Éditorial

Lors de sa séance du 10 avril 1986 à Budapest, le Conseil de la SEL s'est déclaré d'accord avec le Directeur de la publication pour qu'il poursuive ses efforts en vue d'élever encore le niveau scientifique de Nota lepidopterologica. A cet effet, la principale mesure à prendre était d'introduire le système connu de lecture des manuscrits par des spécialistes. Tous les manuscrits reçus sont donc soumis dès maintenant pour appréciation à au moins deux rapporteurs spécialistes. Bien entendu, il sera tenu compte dans ce processus des intérêts des nombreux amateurs dont vit la SEL. Pour atteindre le but fixé, il fallait aussi réorganiser le système de rédaction. Le Comité de rédaction est donc désormais formé de trois membres tous domiciliés en Suisse, lesquels peuvent ainsi se réunir régulièrement, se répartir le travail et le coordonner. M. E. de Bros (Binningen) reste Directeur de la publication (rédacteur) ; il est assisté de deux Rédacteurs adjoints : M. S. E. Whitebread (Magden, Argovie) ancien, et Dr. H. J. Geiger (Berne), nouveau. Les anciens membres non suisses du Comité de rédaction se sont déclarés d'accord avec cette solution. Nous saisissons cette occasion pour les remercier chaleureusement, eux et tous les Conseillers de rédaction désignés en 1980 pour les différents pays d'Europe, de tout ce qu'ils ont fait pendant ces années dans l'intérêt de la SEL et de Nota lepid.

La Rédaction présente enfin à tous les auteurs et aux membres de la SEL ses excuses pour les retards subis l'année dernière du fait de cette réorganisation. Dès maintenant, les difficultés devraient être surmontées.

Pour faciliter la tâche de la rédaction, les auteurs sont priés de tenir compte des «Instructions to authors» qui figurent au verso de la page de couverture. La traduction en français peut être demandée à la rédaction.

La Rédaction.

An seiner Sitzung am 10. April 1986 in Budapest hat der Vorstand der SEL den Schriftleiter ermächtigt, seine Bemühungen fortzusetzen um das wissenschaftliche Niveau der Nota lepidopterologica weiter zu heben. Wichtigste Massnahme im Rahmen dieser Anstrengungen ist die Einführung eines Begutachtersystems. Alle Manuskripte werden ab sofort mindestens zwei Fachreferenten zur Beurteilung vorgelegt. Selbstverständlich sollen dabei die Interessen der zahlreichen Amateure, von denen die SEL lebt, mitberücksichtigt werden. Diese Bemühungen machen auch eine Neuorganisation der Redaktionsarbeit nötig. Der Redaktionsausschuss setzt sich neu aus drei

Mitgliedern aus der Schweiz zusammen, die sich regelmässig treffen und die Arbeit verteilen und koordinieren können. Schriftleiter bleibt E. de Bros (Binningen). Ihm werden zwei Stellv.-Redaktoren zur Seite gestellt : S. E. Whitebread (Magden), bisher, und neu Dr. H. J. Geiger (Bern). Die bisherigen nicht-schweizer Mitglieder des Redaktionsausschusses haben sich mit dieser Regelung einverstanden erklärt. Ihnen und den bisherigen „Länderreferenten" sei für ihre Bemühungen für die Nota lepidopterologica in der Vergangenheit herzlich gedankt.

Die Redaktion muss sich für alle Verzögerungen, die durch diese Neuorganisation im letzten Jahr entstanden, bei allen Autoren und Mitgliedern entschuldigen. Diese Schwierigkeiten dürften nun überwunden sein.

Um die Arbeit der Redaktion zu erleichtern sind die Autoren gebeten die „Instructions to authors" auf der Rückseite der Decke zu berücksichtigen. Kopien dieser Hinweise auf Deutsch können bei der Redaktion erhalten werden.

Die Redaktion.

At the SEL-council meeting of the 10th. April 1986 in Budapest, the editor was authorized to continue his efforts to raise further the scientific standing of Nota lepidopterologica. The most important step to be taken is the introduction of a reviewing process. From now on, all manuscripts will be sent to at least two specialists for refereeing. The interests of the numerous amateurs, without whom the SEL could not survive, shall of course be taken into consideration. Practically, this has necessitated a reorganization of the editorial process. The editorial committee will now comprise three members from Switzerland, who will meet regularly to distribute and coordinate the work. E. de Bros (Binningen) will remain as editor. He will be aided by two assistant editors : S. E. Whitebread (Magden) and (new) Dr. H. J. Geiger (Berne). The previous non-Swiss members of the committee have agreed to this decision. We sincerely thank these, and the previous "country referees" for their efforts for Nota in the past.

The editors sincerely apologize to the authors and members for the delays that occurred last year as a result of this reorganization. It is hoped that these difficulties have now been overcome.

In order to assist the editors in their work, would all authors kindly observe the "Instructions to authors" on the inside front cover of this issue.

The Editor.

An alle Mitglieder !

Der Schatzmeister dankt allen, die bis Ende März ihren Beitrag für 1987 entrichtet haben. Leider haben einige Mitglieder die in den „NACHRICHTEN" Nr. 13 mitgeteilte Erhöhung des Beitrags auf DM 50,- übersehen. Wir bitten diese freundlich, den noch ausstehenden Restbetrag von DM 10,- zu überweisen. Alle Mitglieder, die ihren Beitrag für 1987 noch nicht bezahlt haben (das ist etwa die Hälfte), bitten wir dringend dies baldmöglichst nachzuholen. Wir danken für Ihr Verständnis.

A tous nos membres

Le Trésorier remercie tous ceux qui ont payé avant fin mars leur cotisation pour 1987. L'augmentation de celle-ci à DM 50.- annoncée dans «NOUVELLES/NEWS» n° 13 a malheureusement échappé à l'attention de quelques-uns. Nous serions reconnaissants à ces membres de bien vouloir verser les DM 10.- qui manquent. Par ailleurs, nous prions instamment tous ceux qui n'ont pas encore payé leur cotisation pour 1987 (et c'est près de la moitié de l'effectif !) de faire ce versement le plus tôt possible. D'avance nous les remercions de leur compréhension.

Communication

Cède livres mycologiques et entomologiques : ESSETTE – LE CLAIRE – LAMPERT – BUSTILLO – OBERTHUER (Ét. Lépid. Comp. V-VI-XII) – SHIROZU – LEWIS – LERAUT – ROUGEOT – LHOMME – BERLAND – SCHWARZ – HIGGINS – ALEXANOR – etc.

A. MOKHLÈS, 108, avenue A. Al-Kattabi, Appt. 10, Rabat, Maroc.

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Lepidopterological investigations in Kashmir and Ladakh (India)

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Résumé

Présentation des résultats obtenus en 1984 au cours d'une expédition entomologique au Cachemire et au Ladak (Inde). Brève description de la situation géographique et climatique du Nord-Ouest de l'Himalaya – où se trouvent le Cachemire et le Ladak – et exposé de son rôle possible dans la répartition et la zoogéographie des Lépidoptères (Rhopalocères). Liste des 61 espèces de Rhopalocères observés ou capturés dans différentes localités. Plusieurs espèces ont fait l'objet de commentaires séparés. Les auteurs suggèrent qu'*Aglais ladakensis* Moore 1878 est une bonne espèce ; ils se basent pour cela essentiellement sur leurs observations de la chenille et de la chrysalide. La position systématique de plusieurs Lycénides du complexe *Polyommatus stoliczkanus* n'est pas claire.

I. Introduction

In 1984 we had the possibility to undertake an entomological expedition to the north of India, the districts Kashmir and Ladakh, in the North-West Himalayas. We started the trip on July 11, accompanied by Mrs. Maris Vis and Isabel and Jean Claude Weiss. On July 13 Nishat Gardens were visited, situated along Dal Lake, some kilometers from Srinagar. From Srinagar, we travelled by jeep or taxi to Leh (3500 m), arriving on July 19. On our way, collecting was possible, mainly on high passes such as Zoji-la (3600 m), Namika-la (3700 m) and Fotu-la (4100 m). We then trekked from Martselang, with Nimaling – a glaciervalley at 5000 m – as our aim. Nimaling valley and Gomaru-la could be explored from July 23 till August 2. On our return, two days (August 4 and 5) were spent collecting near Martselang. We left Leh on August 7, and on August 9 another visit was made to Nishat Gardens.

II. North-West Himalaya – geographical situation

The extensive Himalaya system is mostly a Tertiary mountain chain, stretching from Afghanistan to North Burma, together almost 3000 km. The

Himalayas cross several climate-belts. North of the mountain range, the Tibetan plateau stretches at an average elevation of 4800 m above sea-level. In the south we find the great Indian plain, the basin of the river Ganges. The North-West Himalaya is situated between 75° and 78° East, 30° and 36° North (Fig. 1). Compared with the remaining part of the Himalaya, the NW-Himalaya represents a relatively extensive north-south transect. NW-Himalaya is considerably further south than for instance the Alps (46° N). Leh is situated about 34° N, roughly at the latitude of Fès (Maroc).

III. **Climatical conditions**

The Ladakh-region has a central asiatic affinity : it is part of the same dry belt. As Ladakh is situated just beyond the range of the monsoons, most places receive very little rain. The atmospheric aridity in Ladakh, together with the thin air, high u.v. radiation, low pressure and cold winds, determine this district to be an extreme environment : large parts are bare or scarcely vegetated. The timber-line varies up to 3000 m (Alps 2000 m). Beyond the shrub-belts (*Salix* species), there are alpine prairies and finally one finds semi-arid zones, often with bare slopes up to the snow. The average snow-line in Ladakh is about 5700 m. Great differences in temperature exist : in the shade you may find in July a temperature of 2°C at 5000 m, while in the same area in the sun temperatures between 35° and 40°C are not unusual.

IV. **Some zoogeographical aspects**

MANI (1962) notes that in NW-Himalaya no rivers pierce the main range, except the Sutlej in the east and the Indus in the western part. However, in the rest of the Himalayas the main range is cut by many rivers and streams, arising from Tibet, north of the so called crestline. This situation might be important for the distribution of insects.

Penetration by both northern and southern faunal elements must be difficult. This provides an explanation for the many endemic taxa there. Of all high altitude insects in this area MANI (1962) notes 60% to belong to endemic forms (Lepidoptera 45%). In the northern part, north of the crestline, for instance in Ladakh and Zanskar, he found the number of endemic forms to be highest.

NW-Himalaya is zoogeographically interesting because of the presence of Palaearctic and Oriental elements, in a high altitude fauna. The Himalayas above the timberline is part of the Turkmenian region (MANI 1962). The same author considers NW-Himalaya, Karakorum and the Alai-Pamirs knot to be a separate biogeographical subunit of the Turkmenian (SHIELDS 1981).

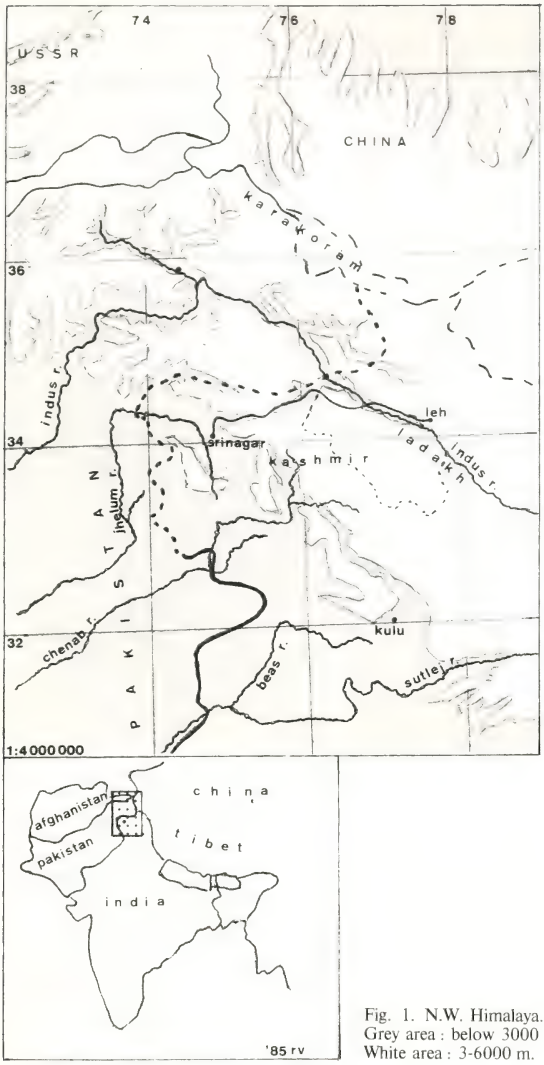


Fig. 1. N.W. Himalaya.
Grey area : below 3000 m.
White area : 3-6000 m.

Some elements of the Mediterranean fauna have been noticed in the Kashmir (valley) and Punjab up to the gorges of Sutlej. Southern elements from the Indian plains penetrate up to the southern slopes of the Himalayas (Fig. 2).

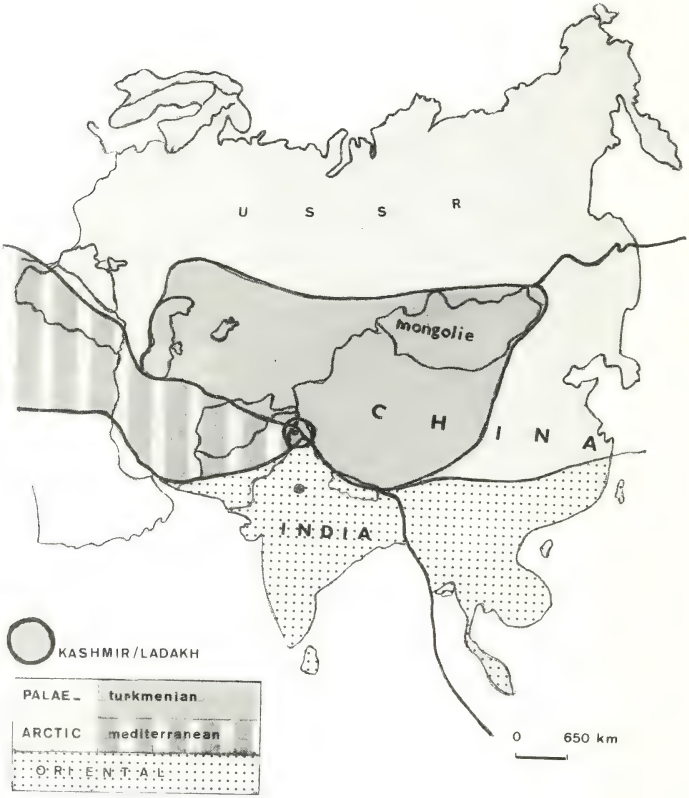


Fig. 2. The zoogeographical regions of Asia, showing their convergence in Kashmir and Ladakh (after MANI).

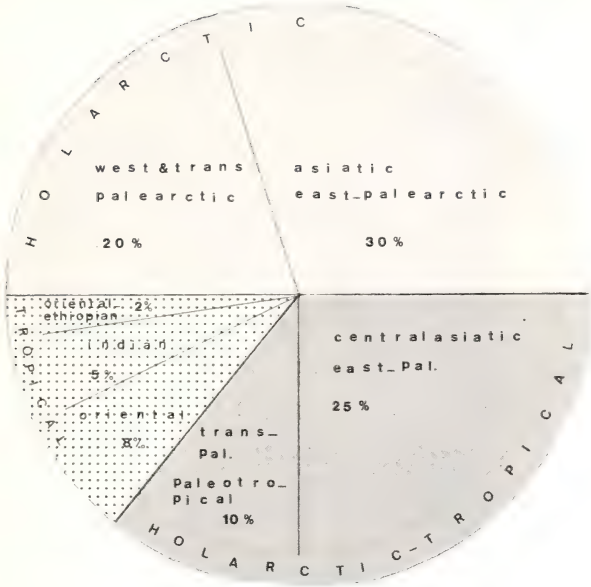


Fig. 3. Analysis of the zoogeographical elements of the observed Rhopalocera in Kashmir and Ladakh, 1984.

Following the zoogeographical classification of KOSTROWICKI (1969), we found that 50% of the observed and/or collected Rhopalocera ([1]) in Kashmir and Ladakh belong to the Holarctic element. Of these, 60% are of central asiatic and eastern Palaearctic origin, e.g. *Parnassius acdestis* GRUM-GRSHIMAILO, *P. epaphus* OBERTHUR, *P. simo* GRAY, *Colias eogene* FELDER, *C. ladakensis* FELDER, *Baltia butleri* MOORE, *Lasiommata menava* MOORE and *Lycaeides christophi* STAUDINGER. Another 35% of the species belong to the Holarctic-tropical element, of which 75% have central and eastern Palaearctic roots. Species like *Parnassius charltonius* GRAY, *P. acco* GRAY, *P. stoliczkanus* FELDER, *Aulocera brahminus* BLANCHARD, *Hyponephele pulchra* FELDER and *Thersamonia solskyi* ERSCHOFF are elements of this character. Finally,

([1]) Based on 50 species. The other species, including the Hesperiidae, are not treated by Kostrowicki in his check-list.

15% are of tropical origin. Among these species are representatives of the Oriental-Ethiopian fauna, e.g. *Tarucus theophrastus* FABRICIUS, all-Oriental elements such as *Pieris canidia* SPARRMAN, *Rapala melampus* CRAMER and *Pseudozizeeria maha* KOLLAR, and Indian elements : *Metaporia leechi* RÖBER and *Polyommatus devanica* MOORE (Fig. 3).

The conclusion is that at least 55% of the observed species are of (central) asiatic and eastern Palaearctic origin. Interesting is the difference in origin of species in the investigated Kashmir area (Nishat Gardens, Zoji-la) : Holarctic 32%, Holarctic-tropical 41% and tropical 26%. The (central) asiatic and eastern Palaearctic affinity here is about 40%. In Ladakh this faunal element increases while the tropical elements decrease.

V. **The collecting grounds**

1. Nishat Gardens (1800 m).

These gardens have been constructed at the foot of mountain slopes along Dal Lake, a complex of lakes, north of Srinagar.

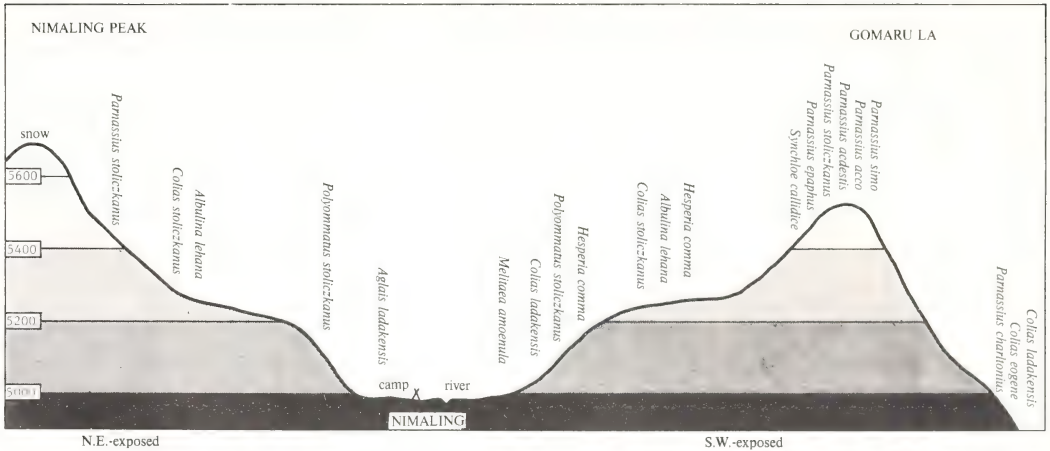
A total of 15 species of Rhopalocera were observed, among which were species of both the Palaearctic and Oriental regions, e.g. *Pieris canidia* SPARRMAN, *Rapala melampus* CRAMER, *R. epyarbas* MOORE and *Parnara guttatus* BREMER. The gardens were visited on July 13 and August 9.

2. Zoji-la (3600 m)

The first high pass on the road from Srinagar to Leh is the Zoji-la. The pass is covered with low, moist grassland vegetation and is free of snow in July, August and September. Nomads graze their goats and sheep here. The meadows are not rich in butterflies. However, on the slopes around the pass the original flora is preserved, but during our stay on the pass, between July 14 and 16, only 15 species were seen.

3. Fotu-la (4100 m)

The highest pass on the road to Leh, situated in Ladakh. The area is quite different from the Zoji-la region ; it is a barren landscape like a desert and the vegetation is very scarce. Along the slopes there are isolated clumps of a yellow *Corydalis* species, the foodplant of *Parnassius charltonius* GRAY in Ladakh. From July 17 to 19 we found 9 butterfly species ; among them were some males of the very local Lycaenid *Thersamonia solskyi* ERSCHOFF. Another Lycaenid, *Albulina omphisa* MOORE, was exclusively found here on thorn-bushes. On some higher slopes, covered with alpine grass vegetation,



Note : not drawn to scale.

Fig. 4. Section drawing of Nimaling valley with its characteristic Rhopalocera in the last week of July 1984.

flew *Hyponephele pulchella* FELDER and *Karanasa huebneri* FELDER, the first rather numerous, the second in modest numbers.

4. Gomaru-la (5500 m)

The Gomaru-la is a pass at about 5500 m which separates the Hemis and Nimaling valleys. The slopes and summit of this pass consist of screes of schistose material. The southern slopes flow gradually to the more overgrown lower levels of Nimaling valley.

Even in summer snow and winds can exert their influences. The snow blizzards may drop the snow-level from about 6000 m to below 5000 m in Nimaling valley. The extreme climatological conditions of Ladakh is demonstrated here most clearly. Frosts are frequent in July. Very little vegetation is present.

In spite of this apparently inhospitable environment, the southern slopes appear to create favourable conditions, mainly for Parnassiidae. When the sun shines, several species fly rapidly at low level over the heated slopes. The insects immediately creep away between the stones, as soon as the sun disappears. They appear again only after at least ten minutes of full sunshine. Apart from *Parnassius*, some specimens of *Synchloe callidice* ESPER and one *Colias elwesi* RÖBER were also observed. On the north side of the pass, towards Hemis valley, we came across two specimens of *Parnassius charltonius* GRAY, some *Colias ladakensis* FELDER and one *C. eogene* FELDER, but the habitat there was no longer comparable with the environment outlined above (Fig. 4).

5. Nimaling valley (5000 m)

This glacier valley is bordered by a number of high peaks to the north-east, with Gomaru-la as the most important pass. The south-west side of the valley is dominated by Nimaling Peak (6000-6300 m), a summit with permanent snow and ice. The orientation of the valley is about south-east/north-west. The valley may be separated into several altitude-zones, each of them inhabited by characteristic Lepidoptera (Fig. 4).

a. Valley bottom (5000 m)

Along the river and its grassy banks very few butterflies were observed. We saw some *Colias stoliczkanus* MOORE on sand- and gravelbanks, obviously having wandered from higher slopes. On a ridge, exposed to the south, we found a small population of *Melitaea amoenula* FELDER. Somewhat higher, on the west side, we discovered sturdy species of nettle (*Urtica* sp.), with both caterpillars and chrysalids of *Aglais ladakensis* MOORE. Some of the chrysalids emerged on the spot and the rest on the way back.

b. *Juniperus* slopes above the riverbed (5000-5200 m)

The steep slopes on the north side of the riverbed are overgrown with thorny, creeping and evergreen shrubs, probably belonging to the genus *Juniperus*. They form a dense, rough vegetation and provide refuge for the insect fauna. This shrubzone is the habitat of *Colias ladakensis* FELDER and here the butterfly is almost exclusively met with. Between the bushes and along animal paths some other species flew : members of the *Polyommatus stoliczkanus* complex ; a few *Albulina lehana* MOORE, as well as *Hesperia comma* LINNAEUS, probably ssp. *shandura* EVANS (SAKAI, 1978). The south side of the valley has the same *Juniperus* belt, but that slope is exposed north and is less rich in species and individuals. In fact *Colias ladakensis* FELDER and *Hesperia comma* LINNAEUS were totally absent here.

c. The plains ("yakzone"), (5200-5400 m)

These prairies with their gentle slopes are used in summer as pastures for horses, sheep, goats and yaks. In spite of this extensive grazing, the original vegetation is intact. The meadows go on up to the screes of Gomaru-la.

Hesperia comma LINNAEUS was active here as well as higher up. We found *Colias stoliczkanus* MOORE, a small orange Clouded Yellow, in areas sheltered against strong winds. Among the females beautiful transitional forms from orange-yellow to whitish were observed. Here we found again *Albulina lehana* MOORE. Close to the screes, on the highest parts of the meadows, *Parnassius stoliczkanus* FELDER was seen, flying down from the screes, its real habitat.

6. Martselang (3400 m)

This tiny village is situated at the entry to Hemis valley. In the vicinity of the village there is a semi-cultivated landscape with small fields and plots of hayland, surrounded by ruderal areas, partly planted with *Salix* bushes. The area is irrigated by small, man-made ditches.

On this ruderal ground we found a rich population of a Lycaenid, belonging to the complex of *Polyommatus stoliczkanus* FELDER. The males are brilliant blue, like *Polyommatus eroides* FRIVALDSKY and are not very variable at least on the upperside. However, the females differ quite remarkably from each other, both in markings and in the colour of the upperside of the wings. The taxonomic status of this Lycaenid is not clear. Species of the *stoliczkanus*-group are confusingly variable in size, colour and markings, which caused many descriptions of (sub) species and forms, many of which are probably synonyms. In fact this group ought to be revised and we hope to work it out in future.

In the same biotope *Lycaeides christophi* STAUDINGER flew in small numbers. This is a less striking species that may be overlooked very easily. Finally, it is worth mentioning the presence of some specimens of *Hyponephele davendra brevistigma* MOORE, which closely resembles *H. tenuistigma* MOORE of Baluchistan and Chitral.

VI. **Systematic part**

Pieridae

Metaporia leechi MOORE, 1904 (Fig. 5 : 1)

Metaporia is a diverse genus, mainly Oriental, but it is also found in the eastern parts of the Palaearctic region. *M. leechi* is distributed from Baluchistan up to Chitral and also in Ladakh. It is similar to *leucodice* EVERSMANN and *soracta* MOORE 1857.

On the upperside, the species can be recognized by the broader black bands on the fore- and hindwings. Also the apex is more pointed. The complete postdiscal band is striking. The veins in the discal- and apical area are brown-blackish. The black cellular spot extends to the costa of the forewing. The blackish post-discal "chevrons" on the upperside of both wings, and the underside of the hindwings are also characteristic. *M. leechi* is smaller than both *leucodice* and *soracta* (35 mm).

The species has been recorded from 3000-3700 m. Its flight is rapid and reminds one of *Synchloe callidice* ESPER. In the middle of July we only found one worn female in one of the valleys north of the Zoji-la at 3700 m.

Colias stoliczkanus MOORE, 1878

This high-mountain species was described from the Chang-la (5300 m). Specimens are known only from Kashmir, Ladakh and Sikkim (ssp. *miranda* FRUHSTORFER). This is a remarkably discontinuous distribution, but recently a link has been discovered in Nepal : ssp. *cathleenae* EPSTEIN 1979.

In Nimaling valley, *C. stoliczkanus* flies on grassy slopes from 5200-5400 m. The males move rapidly just above the vegetation. The females are much less active and hide in the vegetation. In its habitat, the insect is not rare, but difficult to follow because of the strong winds. The single generation flies in July ; at the beginning of August most specimens are damaged. Like most high altitude butterflies in Ladakh, the species is not on the wing before eleven o'clock in the morning, or after 14.00 h. Among the females were nice *helice*-like specimens : f. *alba* VERITY.

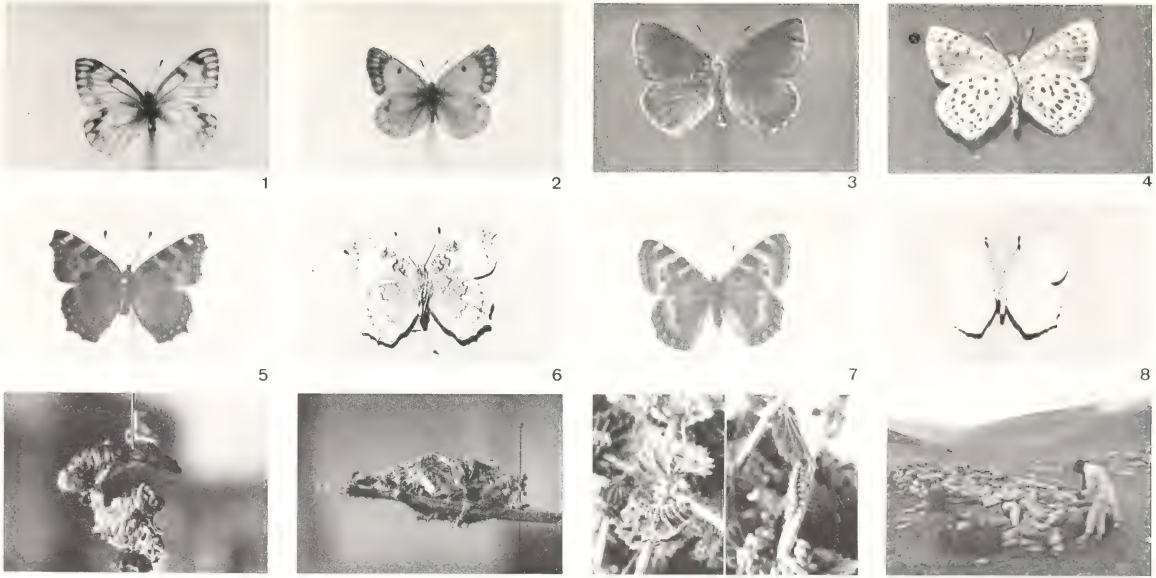


Fig. 5. 1. *Metaporia leechi* MOORE, India, Ladakh, Zoji-la, 3600 m, 15.7.1984.
2. *Colias elwesi* RÖBER, India, Ladakh, Nimaling, 5200 m, 23.7/2.8.1984.
3. *Thersamonia solskyi* ERSCHOFF, India, Ladakh, Fotu-la, 4000 m, 17-19.7.1984.
4. *Thersamonia solskyi* ERSCHOFF, idem, underside.
5. *Aglais urticae* LINNAEUS, Holland, Rotterdam, 6.9.1960.
6. *Aglais urticae* LINNAEUS, idem, underside.
7. *Aglais ladakensis* MOORE, India, Ladakh, Nimaling, 5000 m, 27.7/2.8.1984.
8. *Aglais ladakensis* MOORE, idem, underside.
9. *Aglais ladakensis* MOORE, idem, chrysalid.
10. *Aglais ladakensis* MOORE, idem, pupal spinning.
11. *Aglais ladakensis* MOORE, idem, caterpillar.
12. Biotope *A. ladakensis*; the foodplant (*Urtica* sp.) growing between Mani-stones (Ladakh, Nimaling-valley, 5000 m).

Colias ladakensis C. and R. FELDER, 1865

This striking canary-yellow Pierid is known from between Kashmir and Kumaon, and was collected for the first time in Nepal by EPSTEIN (1979) : Kali Kandales Valley, 3900 m. *Ladakensis* is a typical high-altitude species with a restricted distribution. It occurs at altitudes from 3800 to more than 5000 m. According to KOSTROWICKI (1969), the species is a Tibetan fauna element of the eastern Palaearctic.

The butterfly frequents slopes overgrown with *Juniperus* (dwarf form) and may be locally found there in numbers. It is only occasionally seen outside this habitat. It is mainly on the wing in July and also flies only between 11.00 and 14.00 h. Some females were flushed with a warm orange-yellow. In Nimaling the species was to be found exclusively on sunny slopes between 5000-5200 m.

Colias elwesi RÖBER, 1907 (Fig. 5 : 2)

TALBOT (1939) treated this poorly known *Colias* as a ssp. of *Colias cocandica* ERSCHOFF 1874 : ssp. *thrasibulus* FRUHSTORFER 1910. We found one male of *elwesi* flying on the slopes of Gomaru-la at 5450 m. In spite of looking for many hours, no other specimens were seen. It was collected on very barren steep slopes, where several *Parnassius*, but no other *Colias*, were seen.

The other *Colias* species seen in the Nimaling region were found either in grassy meadows or near *Juniperus* bushes. Because of the lack of data on *elwesi*, we give here a short description :

The upperside ground-colour is greenish-yellow with a prominent black discocellular spot on the forewings ; there is no spot on the hindwings. In contrast to *cocandica*-specimens of Afghanistan and Pamir, and those of Kirghizia (USSR), the hindwings are not dusky, but clear yellow as in *Colias ladakensis* FELDER. Black markings similar to those of *C. ladakensis*. The underside is greenish-white, the veins are not darker. Expanse of the male : 36 mm.

Nymphalidae

Aglais ladakensis MOORE, 1878

The Palaearctic genus *Aglais* HÜBNER, 1818, is represented in Ladakh by the taxa *ladakensis* MOORE and *cashmirensis* KOLLAR, 1844. The status of *ladakensis* is rather unclear. While SEITZ (1909) and SAKAI (1980) treat the butterfly as a high altitude form of *urticae* LINNAEUS 1758, TALBOT (1939) and WYNTER-BLYTH (1957) consider *ladakensis* to be a good species. The insect occurs in NW-Himalaya up to Ladakh and is also known from

6

7

Fig. 6. *Aglais urticae* L. Holland. Male genitalia, prep. nr. 751.
Fig. 7. idem, processus superior.

8

9

Fig. 8. *Aglais ladakensis* M. India, Ladakh, Nimaling 5000 m. Male genitalia, prep. nr. 727.
Fig. 9. idem, processus superior.

Karakorum, West Tibet and Nepal. Specimens have been found up to 5400 m. *Cashmirensis* however, has usually been accepted as a good species, occurring from North India to Tibet, Sikkim and Bhutan.

During our stay in Nimaling we found on a nettle (*Urtica* sp.) many caterpillars in various stages of development and also some chrysalids. The chrysalids were hidden in rolled up and spun leaves of the foodplant : a species with a very strong and persistent 'sting' (Fig. 5 : 9-12). In contrast to the chrysalids of *urticae*, those of *ladakensis* are dull black. The caterpillar is also different : the head is black with tiny black hairs on both sides. The segments are set with one row of dorsal- and three rows of lateral, branched, black and yellowish thorns. The body is black with some reddish tinge. The underside is strikingly paler and of a brownish colour. There are two dorsal and two sublateral rows of yellow spots.

Clear differences between the adults of *ladakensis* and *urticae* also exist (Fig. 5 : 5-8) :

Upperside forewing : In general, smaller and darker. Spot in space 8 less white. No blue markings in submarginal area. Between the costal black spots the yellow is paler. The inner margin spot in spaces 1a, 1b and 2 is more hazy, stretching to the median vein of the cell. The outer margin is less dentate, with no tooth near vein 6.

Upperside hindwing : The dark basal area extends further in the direction of the outer margin. Consequently the postdiscal margin is narrower and often paler yellow. The outer margin is less dentate with a small tooth only near vein 4.

Underside : Less contrasted, especially in the postdiscal- and submarginal areas ; more grey-brown.

Male genitalia (Fig. 6-9) : the most significant and constant difference is in the shape of the processus superior, a process at the upper edge of the valve.

Taking into account all these facts we conclude that *ladakensis* is a bona species.

Melitaea amoenula C. and R. Felder, 1867

This very small species is endemic to Ladakh and Kema above 3500 m (Higgins, 1982). It is closely related to *M. arcesia* Bremer, 1864, occurring in Central Asia (Kukunor, Sajan and Kentei Mts.).

In Nimaling valley we discovered a small population on a grassy and moist part of the riverbed. The butterflies were flying just above the vegetation and

recalled the behaviour of *Mellicta asteria* FREYER, 1828, known from the Central Alps.

Satyridae

Karanasa huebneri C. and R. FELDER, 1867

The distribution of the genus *Karanasa* MOORE, 1891, is limited around the Pamir knot. Western representatives have been recorded from Afghanistan, while species are also known from Tien Shan. AVINOFF and SWEADNER (1951) suggested a classification of the various forms, based on geographical distribution, altitude and reproductive barriers. They distinguished about 20 species. MUNROE (1961) reduced this number to 7 in his critical review.

One of the groups is the so called "*huebneri*-group", mainly distributed in the Hindukush and in the Karakorum area. Within this complex two types may be recognised :

- forms with a strongly contrasting wing pattern, present in the Hindukush (Afghanistan).
- pale forms with faint wing markings, known from NW-Himalaya, so including Zanskar and Ladakh.

During our expedition a few specimens were noticed on a slope of the Fotu-la, overgrown with stiff grasses. *Huebneri* is adapted excellently to its surroundings. The butterflies are extremely difficult to see when they are sitting on the ground. Our specimens belong to the form *expressa* AVINOFF and SWEADNER, 1951, seeming characteristic for Ladakh between 3500-5000 m.

Hyponephele pulchella C. and R. FELDER, 1867

In Ladakh, *pulchella* is the most common of the several species of the genus *Hyponephele* MUSCHAMP, 1915, which occur in that area. On the Namika-la (3500 m), a pass on the road to Leh between Zoji-la and Fotu-la, we found *pulchella* on rather barren slopes with a deep-brown soil, together with *H. davendra* MOORE, 1865. On the Fotu-la, at about 3800 m, *pulchella* was considerably more numerous on open, windy, rough and steppe-like ground. A comparison of series from the Namika-la and Fotu-la only showed slight differences in the ocelli ; colour differences were barely noticeable.

Hyponephele coenonympha C. and R. FELDER, 1867

This species is distributed in Pakistan, Kohistan and Kashmir. It was just emerging in mid July on the Zoji-la (only males). The species preferred overgrown ridges along steep, rocky slopes.

Paralasa kalinda MOORE, 1893

The genus *Paralasa* MOORE, 1891, closely related to *Erebia*, is distributed in the higher mountains of central Asia (NW-Himalaya, Szechwan, East Tibet, Karakorum, Pamir, Tien Shan, Hindukush). In 1973, *Paralasa* material was collected from NW-Nepal by MARTENS. The material was studied by PAULUS (1982), who realised that the species was new and described it as *P. nepalica*. *Nepalica* represents the most eastern species of the genus *Paralasa* known in the Himalaya. *Paralasa* is represented by only two species in Kashmir and Ladakh : *mani* de NICEVILLE, 1880, and *kalinda*. *P. kalinda* is only distributed in India north of Kashmir and Kumaon. *P. mani* is mainly distributed in East Afghanistan and in the border-area between USSR and China.

Like other *Paralasa* species, *kalinda* prefers the pine forest belt and the insect may occur there in numbers. Along the road to the Zoji-la, the species was not rare at 3000 m on south-facing slopes. At the beginning of August *kalinda* was even more common here. On the pass itself the species was seen at 3600 m, far above the pine forest !

Lycaenidae

Thersamonia solskyi ERSCHOFF, 1874 (Fig. 5 : 3, 4)

The genus *Thersamonia* VERITY, 1919, is represented in Ladakh only by the taxon *solskyi* ERSCHOFF, 1874. It is a species which is distributed in the Afghanistan-Pamir-Alai-Ladakh region. Only a few records are known ; the species seems to be especially rare and local in Ladakh (SCHURIAN and HOFMANN, 1982). The form *aditya* MOORE, 1874, was described from the Drass valley (Ladakh). The underside of the hindwings of *aditya* is more yellow and the black borders of the wings are narrower. According to SCHURIAN and HOFMANN (1982), this form is found in Afghanistan as well. However, some males and females of *aditya* from Afghanistan figured by SAKAI (1980) in colour, do not agree with our specimens :

- the groundcolour of the underside of the forewings is orange-yellow,
- the underside of the hindwings is the same pale yellow as SAKAI's specimens, but the fringes are not white but grey and the ocelli are more elongated,
- the orange band on the underside of the hindwings is more pronounced.

We may conclude that our specimens do not agree completely with *aditya*, as described by MOORE in 1874. Our males are of the size of ssp. *solskyi* (in fact 31 mm), while the male figured by MOORE seems to be much larger (SCHURIAN and HOFMANN, 1982).

We found some specimens on both the south and north sides of the pass Fotu-la (4100 m). On the south side at 3800 m we noticed two males, resting in thorn bushes in the evening. Several Lycaenids were seen on the same bushes, i.e. *Albulina omphisa* MOORE, *Polyommatus stoliczkanus* FELDER, *Polyommatus devanica* MOORE. On the north side of the pass at 4100 m two males were observed in a small dry and very hot valley with deep brown soil with only some *Artemisia* plants. These plants were the resting place of the butterflies.

As no other material of *aditya* from Ladakh seems to be illustrated or available, the upper- and underside of a male is figured here.

Hesperiidae

Pyrgus cashmirensis MOORE, 1874

This species was only seen on the Zoji-la at about 3500-3600 m. DE JONG (1979) investigated the distribution of *cashmirensis*. It runs from the Hissar Mts to central Hindukush and through Pamir and Kashmir up to Kumaon. Striking is the isolated (?) appearance in Bhutan. Three subspecies are recognized. Our specimens belong to the nominate ssp. *cashmirensis*, the distribution of which stretches from Baltistan through Ladakh, Lahoul, Kulu to Kumaon and furthermore Bhutan.

VIII. List of Lepidoptera, observed and/or collected during our entomological expedition to Kashmir and Ladakh (India) from July 11 to August 11, 1984

	1	2	3	4	5	6	remarks
Papilionidae							
Parnassius epaphus OBERTHÜR, 1879				x			
Parnassius stoliczkanus FELDER, 1865				x			+ Nimaling peak
Parnassius maharaja AVINOFF, 1916							leg. J. C. WEISS near location 4
Parnassius simo GRAY, 1852				x			
Parnassius acco GRAY, 1852				x			
Parnassius charltonius GRAY, 1852		x	x	nsx			+ Namika-la, 3500 m
Parnassius acdestis GRUM-GRSHIMAILO, 1891				x			
Papilio machaon LINNAEUS, 1758							Paskyum, Namika-la
Pieridae							
Baltia butleri MOORE, 1882					x		leg. J. C. WEISS
Metaporia leechi MOORE, 1904		x					
Pieris brassicae LINNAEUS, 1758	x						+ 10 km E. of Dras
Pieris rapae LINNAEUS, 1758						x	+ Saspul, Paskyum
Pieris canidia SPARRMAN, 1768	x						
Synchloe callidice ESPER, 1805				x	x		
Pontia daplidice LINNAEUS, 1758	x					x	

	1	2	3	4	5	6	remarks
Pontia chloridice HÜBNER, 1808			x				
Catopsilia crocale CRAMER, 1775	x						
Colias elwesi RÖBER, 1907				x			
Colias erate ESPER, 1808						x	+ 10 km E. of Dras 8 km W. of Kargil
Colias eogene C. and R. FELDER, 1865		x		nsx	x		
Colias stoliczkanus MOORE, 1878					x		
Colias fieldi MÉNÉTRIER, 1855	x	x					Sonmarg ; 10 km E. of Dras
Colias ladakensis C. and R. FELDER, 1865				nsx	x		
Gonepteryx rhamni LINNAEUS, 1758							10 km E. of Dras
Nymphalidae							
Vanessa cardui LINNAEUS, 1758	x						
Aglais cashmirensis KOLLAR, 1844	x	x					
Aglais ladakensis MOORE, 1878					x		caterpillars and chrysalids
Fabriciana adippe SCHIFFERMÜLLER, 1775		x					
Fabriciana niobe LINNAEUS, 1758			x	x			observed by J. C. WEISS
Boloria pales SCHIFFERMÜLLER, 1775		x					
Melitaea amoenula C. and R. FELDER, 1867					x		
Satyridae							
Lasiommata menava MOORE, 1865	x	x					
Hyponephele pulchella FELDER, 1867			x				+ Namika-la
Hyponephele pulchra FELDER, 1867		x					
Hyponephele coenonympha FELDER, 1867		x					
Hyponephele davendra MOORE, 1865			x			x	
Hipparchia parisatis KOLLAR, 1850							Khalsi
Pseudochazara lehana MOORE, 1878							Namika-la, Hemis-valley
Karanasa huebneri FELDER, 1867			x				
Aulocera brahminus BLANCHARD, 1844		x					
Paralasa kalinda MOORE, 1893		x					
Lycaenidae							
Rapala melampus CRAMER, 1775	x						
Rapala epyarbas MOORE, 1857	x						
Lycaena phlaeas LINNAEUS, 1761		x					
Thersamonia solskyi ERSCHOFF, 1874			x				
Rapsidia kasyapa MOORE, 1865		x					observed by Weiss
Lampides boeticus LINNAEUS, 1767	x						
Tarucus theophrastus FABRICIUS, 1793	x						
Pseudozizeeria maha KOLLAR, 1848	x						
Celastrina argiolus LINNAEUS, 1758							Paskyum, 10 km E. of Dras, 8 km W. of Kargil
Lycaeides christophi STAUDINGER, 1874						x	
Everes argiades PALLAS, 1771	x						
Albulina lehana MOORE, 1878				x	x		
Albulina galathea BLANCHARD, 1844		x					
Albulina omphisa MOORE, 1874			x				
Albulina leela NICÉVILLE, 1883		x					
Polyommatus devanica MOORE, 1874			x				
Polyommatus stoliczkanus FELDER, 1865		x?	x?		x	x?	

	1	2	3	4	5	6	remarks
Hesperiidae							
Pyrgus cashmirensis MOORE, 1874		x					
Hesperia comma LINNAEUS, 1758			x		x		
Parnara guttatus MOORE, 1865	x						
Number of species per locality	15	18	11	12	10	6	Total number of species : 61

Key to localities

1 – Nishat gardens (Srinagar), 1800 m.
2 – Zoji-la, 3500 m.
3 – Fotu-la, 4100 m.
4 – Gomaru-la, 5500 m.
5 – Nimaling valley, 5000/5400 m.
6 – Martselang, 3400 m.
ns – north side

Acknowledgements

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Literature

AVINOFF, A. and SWEADNER, W. R., 1951. – The *Karanasa* Butterflies, a Study in Evolution. *Ann. Carnegie Museum*, 32, 1 : 1-251, pl. 1-17.

EPSTEIN, H. J., 1979. – Interesting, rare and new Pierids (Lepidoptera : Pieridae) from the Central Nepal Himalayas. *Ent. Gazette* 30 : 90-96.

HIGGINS, L. G., 1982. – A revision of *Phyciodes* HUEBNER and related genera, with a review of the classification of the Melitaeinae. *Bull. Br. Mus. nat. Hist.* 43 : 77-243.

JONG, R. DE, 1979. – Revision of the *Pyrgus alpinus* group (Lepidoptera, Hesperiidae), with notes on phylogeny and character displacement. – *Zool. Meded.* Deel 54 : 53-82.

KOSTROWICKI, A. S., 1969. – Geography of the palearctic Papilionoidea (Lep.). – *Zakl. zool. Syst. polsk. Akad. Nauk.*, Krakow : 380.

MANI, M. S., 1962. – Introduction to High Altitude Entomology. Methuen and Co. Ltd, London : 302.

MUNROE, E., 1961. – The Classification of the Papilionidae (Lepidoptera). – *Can. Ent. Suppl.* 17 : 1-52.

PAULUS, H. F., 1982. – *Paralasa nepalica* n. sp. aus Trockengebieten NW-Nepals. – *Senckenbergiana biol.*, Frankfurt am Main, 63 : 337-346.

SAKAI, S., 1978. – Butterflies from the Hindukush, Karakorum, Kashmir and Ladak, with Descriptions of two new Species and six Subspecies. – *Atalanta*, Würzburg, Bd IX, Heft 1 : 104-132.

–, 1980. – Butterflies of Afghanistan, (Japan) : 272.

SCHURIAN, K. G. und HOFMANN, P., 1982. – Die *Thersamonia*-Gruppe (Lepidoptera, Lycaenidae). – *Nachr. ent. Ver. Apollo*, Frankfurt, Suppl. 2 : 1-59.

SEITZ, A., 1909. – Die Gross-Schmetterlinge der Erde. I. Abteilung. Die Gross-Schmetterlinge des Palaearktischen Faunengebietes. 1. Band : Die Palaearktischen Tagfalter, Stuttgart : 379.

SHIELDS, Al., 1981, 1982. – International Nepal Himalaya Expedition for Lepidoptera (INHELP) 1977, Report 1 : Introduction and Lycaenidae. – *Journ. of Res. on the Lepidoptera*, 20 (2) : 65-80.

TALBOT, G., 1939. – Fauna of British India-Butterflies, 2nd ed., Vol. I : 600.

WYNTER-BLYTH, M. A., 1957. – Butterflies of the Indian Region, Bombay : 523.

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Contributions à la connaissance des *Coleophoridae*. XLVI Sur quelques Coleophores nouvelles ou peu connues d'Espagne et des Canaries

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Abstract

Five new species of Coleophoridae (*C. aliena, C. beticella, C. jynxella, C. sciurella, C. vivesella*) from Spain, and one from the Canary Islands (*C. teneriffella*) are described in this work. The female genitalia of *C. hiberica* BALDIZZONE, and *C. nevadella* BALDIZZONE are described and illustrated for the first time. Three species (*C. berlandella* TOLL, *C. microalbella* AMSEL, *C. sabulella* TOLL) are new to the European Fauna ; four species (*C. ciconiella* H.-S., *C. insulicola* TOLL, *C. fiorii* TOLL, *C. macrobiella* CONSTANT) are recorded from Spain for the first time.

Au cours du mois de juillet 1985, j'ai effectué une période de recherches avec l'ami Ernst TRAUGOTT-OLSEN en Andalousie, dans la région de Baza (prov. de Granada) et sur la Sierra Nevada, tant sur le versant oriental (Capileira) que sur le versant occidental (route de la Veleta). Dans le travail qui suit, je présente les nouveaux taxa que j'ai découverts (*Coleophora beticella, C. jynxella, C. sciurella, C. aliena, C. vivesella*) et je donne aussi la description des genitalia femelles de *C. hiberica* BALDIZZONE et de *C. nevadella* BALDIZZONE. Je décris aussi *C. teneriffella* n. sp., espèce des Canaries, déjà connue et traitée par J. KLIMESCH, qui ne lui avait pas donné de nom. A cette occasion, je désire remercier encore une fois le cher ami Ernst TRAUGOTT-OLSEN, pour toute l'aide qu'il m'a apportée en Espagne, le Dr. J. KLIMESCH, qui m'a permis d'illustrer l'espèce de Teneriffe en me donnant l'holotype, et comme d'habitude M. Emmanuel DE BROS, qui a aimablement revu le texte en langue française.

Coleophora hiberica BALDIZZONE, 1985
(Nota lepid., *8* (3) : 207)

J'ai décrit cette espèce sur la base du seul ♂, recueilli par K. SATTLER en Andalousie, dans la région de Orgiva (prov. de Granada). En 1985, j'ai eu la chance de capturer à la lampe un couple de cette espèce, plus haut que la localité typique, sur le versant oriental de la Sierra Nevada, raison pour laquelle je peux maintenant décrire les genitalia femelles (fig. 7 et 8) :

Papillae anales ovales. *Apophyses* postérieures à peu près 2 fois plus longues, que les antérieures. *Lamella antevaginalis* subtrapézoïdale, très peu sclérifiée, seulement au milieu, profondement creusée en moitié, en rapport avec l'*ostium bursae. Lamella postvaginalis* subtrapézoïdale, peu marquée. *Ostium bursae* ogival, ample, avec bord bien chitinisé. *Infundibulum* étroit, presque transparent. *Ductus bursae* transparent, court, s'élargit graduellement jusqu'à la bourse, qui est petite, ronde, dépourvue de *signum.*

Note : Les genitalia femelles confirment que l'espèce appartient au 6e groupe de TOLL.

C. aliena n. sp.

Localité typique : Espagne méridionale, Andalousie, Baza.

Diagnose : Exp. alaire 9 mm. Tête (fig. 5) thorax et abdomen jaune clair nacré. Palpes labiaux jaunes : le second article est à peu près 2 fois plus long que le troisième. Antennes avec le *flagellum* annelées de jaune et de brun-clair. Ailes antérieures de couleur jaune paille uniforme, très nacré ; franges jaunes. Ailes postérieures et franges jaune gris nacré.

Genitalia mâles (fig. 10 et 11) : *Gnathos* large, ovale. *Tegumen* en forme de «8». *Transtilla* petite, subtriangulaire. *Valva* très étroite et allongée. *Valvula* très petite, presque impossible à observer. *Sacculus* avec structure très simple, subtriangulaire. Édéage court, conique, plus sclérifié dorsalement. Pas de *cornuti.*

Structure de renforcement de l'abdomen (fig. 12) : Barres latéro-antérieures à peu près 2 fois plus longues que les postérieures. Barre transversale droite avec le bord proximal mince, et le bord distal plus épais latéralement. Disques tergaux (3e tergite) à peu près 4,5 fois plus longs que larges.

Note : L'espèce, dont ♀ et bionomie sont inconnues, doit être placée dans le 8e groupe de TOLL par la structure du *gnathos*, du *tegumen* et de l'édéage. Elle peut être aisément identifiée par la structure caractéristique des genitalia : les valves très allongées et le *sacculus* subtriangulaire ne permettent de rapprocher cette n. sp. d'aucune espèce déjà connue de ce groupe.

Répartition géographique : Connue seulement de la localité typique.

Matériel examiné : Holotype ♂ (PG Bldz 7740) : «HISP. Prov. de Granada N. 342 × Rio Baza, 7.-9.VII.1985, G. Baldizzone y E. Traugott-Olsen», coll. BALDIZZONE.

C. nevadella BALDIZZONE, 1985
(Nota lepid., *8* (3) : 211)

J'ai décrit cette espèce sur la base d'une série de ♂♂ de la Sierra Nevada. Au cours de mon voyage en Espagne en 1985, j'ai recueilli une série de ♀♀ dans la localité typique, chose qui me permet maintenant de décrire les genitalia femelles (fig. 14 et 15) :

Papillae anales grandes, ovales, très sclérifiées. *Apophyses* postérieures à peu près 2 fois plus longues que les antérieures. *Lamella antevaginalis* très caractéristique, constituée par deux barres courbes fortement chitinisées, qui délimitent l'*ostium bursae. Lamella postvaginalis* subtrapézoïdale. *Ostium bursae* ovale, très allongé. *Infundibulum* débutant en forme d'ampoule pourvue de quelques petites épines chitineuses, se continue tubulaire, bien sclérifié, avec ligne moyenne. *Ductus bursae* très long, complètement revêtu par deux bandes hérissées de petites épines coniques. Bourse ample, avec un grand *signum* en forme d'ancre.

Note : La découverte de la ♀ confirme que *nevadella* est une espèce bien différenciée de *C. ornatipennella* HÜBNER et *C. lixella* ZELLER de l'Europe et de *C. malatiella* TOLL et *C. caucasica* STAINTON d'Asie mineure. Elle me semble présenter un «passage» de *C. ornatipennella* à *C. malatiella.*

Répartition géographique : L'espèce, dont la bionomie est inconnue, a été recueillie seulement sur la Sierra Nevada.

C. vivesella n. sp.

Localité typique : Espagne méridionale, Andalousie, Baza.

Diagnose : Exp. alaire 8-10 mm. Tête (fig. 6) jaune-ocre clair. Palpes blancs : le second article, revêtu latéralement d'écailles brunes, est à peu près 0,5 fois plus long que le troisième. Antennes dépourvues de poils à la base ; *flagellum* annelé de blanc et brun. Thorax et abdomen jaune-ocre. Ailes antérieures jaune-ocre clair, parsemées de quelques écailles brunes ; une faible ligne blanche, peut s'observer sur la nervure moyenne et le long de la *costa.* Franges de l'aile antérieure jaune-gris nacré. Ailes postérieures brun-gris clair ; franges jaune-gris nacré.

Genitalia mâles (fig. 17 et 18) : *Gnathos* petit, rond. *Tegumen* avec deux bras larges. *Transtilla* allongée. *Valva* longue, plus large à l'apex qu'à la base. *Valvula* petite, arrondie. *Sacculus* caractérisé par la forme subtriangulaire de l'angle dorso-caudal, qui porte au milieu une dent émoussée. Édéage allongé, présentant deux barres sclérifiées, dont l'une se termine en pointe aiguë, et

l'autre avec une longue dent. Les *cornuti* sont nombreux, réunis en une longue chaîne.

Structure de renforcement de l'abdomen (fig. 19) : Pas de barres latéro-postérieures, la barre transversale, épaisse, présente un bord proximal droit, et un bord distal convexe. Disques tergaux (3e tergite) à peu près 5 fois plus longs que larges.

Genitalia femelles (fig. 21 et 22) : *Papillae anales* petites, subtriangulaires. *Apophyses* postérieures à peu près 3 fois plus longues que les antérieures. *Lamella antevaginalis* subtrapézoïdale, creusée dans la région de l'*ostium bursae*, qui est de forme ogivale, allongée. *Lamella postvaginalis* beaucoup plus étroite que l'*antevaginalis*, avec le bord proximal irrégulièrement triangulaire. *Infundibulum* en forme d'ampoule chitinisée. *Ductus bursae* revêtu d'épines très petites, presque sur la moitié de sa longueur ; la seconde moitié est transparente, jusqu'à la bourse, qui est petite et ronde, pourvue d'un petit *signum* en forme de feuille.

Note : L'espèce, dont la bionomie est inconnue, appartient au 30e groupe de TOLL, mais à cause de la structure des genitalia, on ne peut pas la rapprocher d'une autre espèce déjà connue. Peut-être doit elle se placer dans la section de *versurella*, s'en distinguant aisément à cause de la structure du *sacculus*, large et subtriangulaire dans l'angle dorso-caudal, et de l'édéage, beaucoup plus allongé, se terminant par une longue pointe courbe. Les genitalia femelles de *vivesella* sont tout-à-fait différents...

Répartition géographique : *C. vivesella* n. sp. a été recueillie seulement dans la région de Baza.

Matériel examiné : Holotype ♂ (PG Bldz 7739) : «HISP. Prov. de Granada, Sierra de Baza, 10.VII.1985, G. Baldizzone y E. Traugott-Olsen», coll. BALDIZZONE.

Paratypes : 1 ♂ (PG Bldz 7721), 12 ♀♀ (PG Bldz 7669-7678-7685-7688-7691-7714-7719-7725-7727-7732-7734-7748) : même localité et date.

– 3 ♀♀ (PG Bldz 7659-7694-7733) : «HISP. Prov. de Granada, N 342 × Rio Baza, 7.-9.VII.1985, G. Baldizzone & E. Traugott-Olsen».
– 2 ♀♀ (PG Bldz 7730-7731) : HISP. Prov. de Granada, N 342, 8 km al este de Baza, 11.VII.1985, G. Baldizzone & E. Traugott-Olsen». Tous les paratypes sont conservés dans la coll. BALDIZZONE.

Derivatio nominis : L'espèce est dédiée au cher ami Dr. Antonio VIVES MORENO de Madrid, en lui souhaitant un avenir entomologique toujours plus fécond.

C. jynxella n. sp.

Localité typique : Espagne méridionale, Andalousie, Sierra Nevada.

Diagnose : Exp. alaire 9-11 mm. Tête (fig. 2) blanche, couverte dorsalement d'écailles brunes. Palpes labiaux blancs, revêtus latéralement d'écailles brunes : le second article est à peu près 3 fois plus long que le troisième. Antennes dépourvues de poils à la base ; le *flagellum* est annelé de blanc et brun. Thorax et abdomen blancs, couverts d'écailles brunes. Ailes antérieures de couleur blanc parsemées d'écailles brunes, qui forment trois lignes le long de la costa, de la nervure cubitale et de la nervure anale. Franges brun-jaune nacré. Ailes postérieures brunes, avec franges brun-jaune nacré.

Genitalia mâles (fig. 24 et 25) : *Gnathos* ovale. *Tegumen* avec bras élargis. *Transtilla* large, trapézoïdale. *Valva* large. *Valvula* petite et arrondie, bien individualisée. *Sacculus* caractérisé par un *processus* dans l'angle dorso-caudal, qui porte 3 dents différents tournées vers l'intérieur. Édéage constitué par un corp cylindrique, trapu, duquel part une baguette sclérifiée portant à l'apex une longue dent. Un seul *cornutus*, très long, mince et courbe.

Structure de renforcement de l'abdomen (fig. 26) : Pas de barres latéro-postérieures, la barre transversale, très épaisse, a le bord distal constitué par deux demi-lunes. Disques tergaux (3e tergite) à peu près 6 fois plus longs que larges.

Genitalia femelles (fig. 28) : *Papillae anales* petites ovales. *Apophyses* postérieures à peu près 2 fois plus longues que les antérieures. *Lamella antevaginalis* subtrapézoïdale avec le bord distal arrondi, pourvu de quelques poils. *Lamella postvaginalis* plus petite, presque la moitié de l'*antevaginalis*, dont elle conserve la forme. *Ostium bursae* très large, ogival. *Infundibulum* asymétrique, avec une part distale en forme de coupe et une part proximale, qui présente une protubérance latérale en forme de goute. *Ductus bursae* avec 2/3 de sa longueur pourvus d'une ligne moyenne ; le 1/3 initial est revêtu d'un manchon de petites épines coniques, tandis que la dernière partie du *ductus* est complètement transparente. Bourse petite, ronde, avec un petit *signum* en forme de feuille.

Note : L'espèce, dont la bionomie est inconnue, appartient au 30e groupe de Toll, et par la structure des genitalia mâles peut être quelque peu rapprochée de *C. otitae* Zeller. De cette espèce, elle se distingue aisément, avant tout par sa taille, qui est presque la moitié de celle de *otitae*. Pour les genitalia ♂, *jynxella* est très caractéristique par la structure de l'édéage, beaucoup plus court que celui d'*otitae*, pour le processus apical de la valve, et par le long *cornutus*. Les genitalia femelles de *jynxella* diffèrent de ceux d'*otitae* d'une façon presque complète : tout le *ductus bursae* de *jynxella* est revêtu d'épines,

tandis que celui d'*otitae* porte des épines seulement sur une petite portion ; mais il faut surtout remarquer la structure asymétrique de l'*infundibulum* de *jynxella*, qui n'a pas de correspondance avec celle des espèces du même groupe.

Répartition géographique : Connue seulement d'Espagne (Sierra de Gredos et Sierra Nevada).

Matériel examiné : Holotype ♂ (PG Bldz 7745) : «Hisp. Sierra Nevada, Camino de la Veleta, 1600 m, 19.VII.1985, G. Baldizzone y E. Traugott-Olsen», coll. Baldizzone.

Paratypes : 1 ♀ (PG Bldz 4142) même localité, 1700 m, 23.VII.1983, leg. G. Baldizzone & P. Triberti, coll. Baldizzone.

– 1 ♂ (PG Bldz 6631) : «Süd-Spanien, Sierra Nevada, Puerto de la Ragua, 1800 m, 18.VII.1980, leg. Gg. Derra», coll. Derra, Bamberg (R.F.A.).
– 1 ♂ (PG Bldz 7062) : «Hispania, 19.7.1980, Sierra de Gredos, Navacepeda, 1500 m. M.u.E. Arenberger» ex coll. Burmann, coll. Baldizzone.

C. teneriffella n. sp.

Localité typique : Îles Canaries, Teneriffa, Guimar.

Diagnose : Exp. alaire 9-10 mm. Tête (fig. 4) thorax et abdomen brun-clair. Palpes labiaux blancs, revêtus latéralement d'écailles brunes : le second article est à peu près 2 fois plus long que le troisième. Antennes avec *flagellum* annelé de blanc et brun. Ailes antérieures brun clair, parsemées d'écailles brun foncé ; rayures blanches le long des nervures. Franges brun-gris clair. Ailes postérieures brunes avec franges brun-gris clair.

Genitalia mâles (fig. 31-32) : *Gnathos* ovale. *Tegumen* avec bras larges et aplatis. *Transtilla* linéaire. *Valva* courte et trapue. *Valvula* chitinisée, ronde et bien individualisée. *Sacculus* allongé et arrondi dans l'angle ventro-caudal, présentant un long *processus* en forme de corne dans l'angle dorso-caudal ; à la base de ce *processus* se trouve une dent émoussée. Édéage avec deux barres presque symétriques, qui portent une dent triangulaire vers la moitié, et une autre, un peu plus grande, à l'apex. Un seul *cornutus* en forme de griffe. Structure de renforcement de l'abdomen (fig. 33) : pas de barres latéro-postérieures, la barre transversale, convexe présente un bord proximal plus épais. Disques tergaux (3e tergite) à peu près 5 fois plus longs que larges.

Genitalia femelles (fig. 36 et 38) : *Papillae anales* étroites, ovales. *Apophyses* postérieures à peu près 2,5 fois plus longues que les antérieures. *Lamella antevaginalis* subtrapézoïdale, avec le bord distal portant deux petites dents aux angles. *Lamella postvaginalis* subtrapézoïdale, de la moitié plus étroite

que l'*antevaginalis. Ostium bursae* petit, ovale, s'ouvrant sur le bord distal de la *lamella antevaginalis. Infundibulum* tubuliforme, très allongé, presque transparent. Le *ductus bursae* débute avec une partie revêtue de petites épines coniques sur une longueur à peu près égale à celle de l'*infundibulum.* Tout le *ductus* qui reste est transparent, jusqu'à la bourse, qui est petite, pourvue d'un petit *signum* en forme de feuille.

Note : L'espèce, dont la bionomie est inconnue, doit être placée dans le 30e groupe de TOLL, près de *C. pyrenaica* BALDIZZONE. Les différences les plus évidentes entre les deux espèces sont les suivantes : chez le ♂ de *teneriffella,* la valve est beaucoup plus longue que chez *pyrenaica,* le processus qui se trouve dans l'angle dorso-caudal est plus court, tandis que celui qui se trouve dans l'angle ventro-caudal est plus prononcé ; l'édéage de *teneriffella* est presque symétrique et les deux barres chitineuses se terminent à l'apex par une petite dent, tandis que chez *pyrenaica* une barre est plus épaisse que l'autre et seulement la plus mince est pourvue d'une dent aiguë à l'apex ; le *cornutus* de *teneriffella* est plus court et trapu de celui de *pyrenaica.* Chez les genitalia femelles, on remarque que l'*ostium bursae* de *teneriffella* est plus large et s'ouvre sur le bord distal de la *lamella antevaginalis,* tandis que celui de *pyrenaica,* plus petit et ogival, s'ouvre vers la moitié de la *lamella* ; l'*infundibulum* de *teneriffella* est tubulaire, tandis que celui de *pyrenaica* est en forme d'ampoule ; le *ductus bursae* de *teneriffella,* beaucoup plus court que celui de *pyrenaica,* a une portion revêtue d'épines double de celle de *pyrenaica.*

C. teneriffella a été découverte comme nouvelle espèce par le Dr. Josef KLIMESCH, qui en a traité dans son travail de 1982 consacré aux Coléophores des Canaries, sans lui donner de nom. C'est pour cette raison qu'il m'a donné l'autorisation de décrire ce nouveau taxon, en me donnant toute l'aide possible, ce dont je le remercie, ainsi que de m'avoir donné l'holotype pour ma collection.

Répartition géographique : Connue seulement de l'île de Teneriffa.

Matériel examiné : Holotype ♂ (PG Bldz 7884) : «INS. CANAR. Ten., Güimar, 15-28.3.1965, J. Klimesch», coll. BALDIZZONE.

Paratypes : 4 ♂♂ (PG Rasmussen 4939) 1 ♀ (PG Rasmussen 4164) : même date et localité, coll. KLIMESCH, Linz.

– 1 ♂, même localité, 29.3.1972, leg. coll. KLIMESCH.
– 1 ♀ (PG Bldz 2814) même localité, 1.IV.1967, leg. PINKER, ex coll. BURMANN, coll. BALDIZZONE.
– 1 ♀ (PG Bldz 4513) : «Iles Canaries, Tenerife, 1000 m. Las Mercedes, 9.IV.1981, F. Coenen leg.», coll. COENEN, Bruxelles.
– 1 ♀ (PG Bldz 7017) : «Islas Canarias, Tenerife, 300 m. San Andres, 13.04.1981, W. De Prins leg.», coll. DE PRINS, Anvers.

C. beticella n. sp.

Localité typique : Espagne méridionale, Andalousie, Baza.

Diagnose : Exp. alaire, 8-9 mm. Tête (fig. 3) thorax et abdomen blancs. Palpes labiaux blancs ; le second article est à peu près 0,5 fois plus long que le troisième. Antennes avec *flagellum* annelé de blanc et brun. Ailes antérieures blanches, parsemées de quelques écailles brunes. Franges blanc-nacré. Ailes postérieures gris clair ; franges blanc nacré.

Genitalia mâles (fig. 40-42-42) : *Gnathos* ovale. *Subscaphium* avec deux bras larges et aplatis. *Transtilla* en forme de faux. *Valva* large. *Valvula* petite, arrondie et chitinisée. *Sacculus* caractérisé par un grand processus subtriangulaire crénelé, dans l'angle dorso-caudal. Édéage constitué par deux barres, dont l'une porte deux grandes dents triangulaires vers le milieu et une autre plus petite à l'apex. *Cornuti* 3-4 petits, réunis. Structure de renforcement de l'abdomen (fig. 41) : Pas de barres latéro-postérieures, la barre transversale, convexe, présente un bord proximal complet et un bord distal constitué par deux demi-lunes. Disques tergaux (3e tergite) à peu près 3 fois plus longs que larges.

Genitalia femelles (fig. 23 et 30) : *Papillae anales* étroites et petites. *Apophyses* postérieures à peu près deux fois plus longues que les antérieures. *Lamella antevaginalis* subtrapézoïdale, hérissée de poils sur le bord distal, qui est un peu creusé au milieu. *Lamella postvaginalis* subtrapézoïdale, plus petite de la moitié que l'*antevaginalis*, a un bord proximal courbé au milieu, en forme de triangle. *Ostium bursae* ovale. *Infundibulum* en forme de coupe, très sclérifié. *Ductus bursae* revêtu, dans sa première moitié, d'épines coniques très petites ; la seconde partie est transparente. *Bursa* petite avec *signum* en forme de feuille.

Note : L'espèce appartient au 30e groupe de Toll et doit être placée près de *C. areniphila* Toll. Les différences chez les genitalia mâles (les genitalia femelles de *areniphila* sont inconnus) sont les suivantes : chez *areniphila*, la valve est plus courte et mince ; l'édéage est constitué par deux barres beaucoup plus minces que celles de *beticella*, et toutes les deux se terminent à l'apex par une dent aiguë, tandis que chez *beticella* seule la barre la plus longue porte une dent subtriangulaire à l'apex ; cette barre est aussi pourvue de deux dents trapues sur le dos, structure qui manque chez *areniphila*.

Répartition géographique : Région de Baza. La bionomie est inconnue.

Matériel examiné : Holotype ♂ (PG Bldz 7655) : «Hisp. Prov. de Granada, N 342 × Rio Baza, 7.-9.VII.1985, G. Baldizzone y E. Traugott-Olsen», coll. Baldizzone.

Paratypes : 1 ♂ (PG Bldz 7680) 4 ♀♀ (PG Bldz 7649-7654-7661-7715) : même date et localité.

– 2 ♂♂ (PG Bldz 7693-7699) 9 ♀♀ (PG Bldz 7672-7673-7682-7684-7687-7690-7692-7724-7729) : «Hisp. Prov. de Granada, N 342, 8 km al este de Baza, 11.VII.1985, G. Baldizzone & E. Traugott-Olsen». Tous les paratypes se trouvent dans la coll. Baldizzone.

C. sciurella n. sp.

Localité typique : Espagne méridionale, Andalousie, Sierra Nevada.

Diagnose. Exp. alaire 8 mm. Tête (fig. 1), thorax et abdomen brun clair. Palpes labiaux blancs ; le second article est à peu près 0,5 fois plus long que le troisième. Antennes avec *flagellum* blanc pour la moitié proximale, et annelé de blanc et brun dans la moitié distale. Ailes antérieures blanches, parsemées d'écailles brunes, qui forment une ligne sur la nervure cubitale et sur la nervure anale. Franges brun-gris nacré. Ailes postérieures et franges brun-gris nacré.

Genitalia mâles (fig. 45 et 46) : *Gnathos* petit, ovale. *Tegumen* très étroit au milieu. *Transtilla* dilatée en forme ovale. *Valva* courte et trapue. *Valvula* petite, ovale, très chitinisée. *Sacculus* caractérisé par un grand processus triangulaire dans l'angle dorso-caudal, surmonté par deux dents émoussées ; à la base de ce processus se trouve une dent plus grande parfaitement triangulaire. Édéage constitué par deux longues barres sclérifiées, plus larges à l'apex qu'à la base ; la plus courte est surmontée par une petite dent triangulaire. Un seul *cornutus* en forme de griffe.

Structure de renforcement de l'abdomen (fig. 47) : Pas de barres latéro-postérieures, la barre transversale est épaisse et presque droite. Disques tergaux (3e tergite) à peu près 6 fois plus longs que larges.

Note : L'espèce, dont femelle et bionomie sont inconnues, doit être placée dans le 30e groupe de Toll, dans la section de *C. kyffusana* Petry, où se trouvent aussi *C. franzi* Klimesch, *C. repentis* Klimesch, *C. karsholti* Baldizzone et *C. parvella* Toll.

C. sciurella n. sp. se distingue aisément de toutes les espèces du groupe par la structure caractéristique de l'édéage, qui est le seul de ce groupe à présenter deux barres aussi différentes, dont l'une linéaire et l'autre renflée dans la moitié apicale ; une structure aussi caractéristique est constituée par le grand processus qui surmonte l'angle dorso-caudal, pourvu d'une forte dent triangulaire à la base, formation se trouvant exclusivement chez *sciurella*.

Répartition géographique : Connue seulement de la Sierra Nevada.

Matériel examiné : Holotype ♂ (PG Bldz 7747) : «HISP. Prov. de Granada Camino de Capileira, 1250 m, 13.VII.1985, G. Baldizzone y E. Traugott-Olsen» coll. BALDIZZONE.

C. berlandella TOLL, 1956
(L'Entomologiste, *12* (4/5) : 106)

Matériel examiné :
– Arragonia, Albarracin, 1400 m, 13.VIII.1984, leg. GRÜNWALD.
– Teruel, Bronchales, 1500 m, 25.-30.VII.1981, leg. A. COX & M. PRICK.
– Navarra, Irurzum, 28.VII.1948, leg. MARTEN, coll. Istituto di Zoologia, Roma.
– Barcelona, Alella, 12.VIII.1956, leg. AGENJO.

Note : L'espèce est nouvelle pour la faune espagnole et pour l'Europe. Jusqu'à présent, elle était connue d'Algérie, Tunisie, Libye et Turkmenistan.

C. ciconiella HERRICH-SCHÄFFER, 1855
(Syst. Bearb. Schmett. Eur., *5* : 252)

Matériel examiné :
– Cuenca, 1000 m, VI, leg. KORB, coll. Musée d'Histoire Naturelle «G. Antipa», Bucarest.

Note : L'espèce est nouvelle pour la faune espagnole ; elle était connue d'Europe septentrionale et centrale, Autriche, Roumanie, Bulgarie, France, Ukraine.

C. fiorii TOLL, 1953
(Mem. Soc. ent. ital., *32* : 104)

Matériel examiné :
– Cataluña, Port Bou, 18.-28.IX.1966, leg. ARENBERGER, coll. Landessamlungen für Naturkunde, Karlsruhe.

Note : L'espèce est nouvelle pour la faune espagnole, étant connue jusqu'à présent seulement d'Italie centrale.

C. insulicola TOLL, 1942
(Veroff. Übersee-Mus. Bremen, *3* (3) : 296)

Matériel examiné :
– Sierra Nevada, Camino de la Veleta, 1600 m, 19.VII.1985, leg. G. BALDIZZONE et E. TRAUGOTT-OLSEN.
– idem, 1000 m, 22.VII.1985.

Note : L'espèce, dont ♂ et bionomie demeurent inconnus, est nouvelle pour la faune espagnole. Jusqu'à présent, elle était connue de Dalmatie, Italie, France méridionale, et Sardaigne.

C. macrobiella CONSTANT, 1885
(Ann. Soc. ent. Fr., 1885 : 7)

Matériel examiné :
– Prov. Gerona, Rosas, 20.VIII.1983, leg. GRÜNEWALD.

Note : L'espèce est nouvelle pour la faune espagnole, étant connue jusqu'à présent seulement de France méridionale.

C. microalbella AMSEL, 1935
(Mitt. Zool. Mus. Berl., *20* : 306)

Matériel examiné :
– Prov. Granada, Baza, 15.-16.V.1979, leg. GLASER.
– idem, N 342 × Rio Baza, 7.-9.VII.1985, G. BALDIZZONE et E. TRAUGOTT-OLSEN leg.
– idem, N 342, 8 km al este de Baza, 11.VII.1985, G. BALDIZZONE et E. TRAUGOTT-OLSEN leg.

Note : L'espèce, dont la bionomie est inconnue, était signalée seulement de Palestine. Elle est donc nouvelle pour la faune espagnole et pour l'Europe. Je signale que j'ai étudié des exemplaires de Tunisie et d'Algérie, recueillis par DUMONT et CHRÉTIEN, qui m'ont été donnés par F. HARTIG.

C. sabulella TOLL, 1952
(Bull. Soc. ent. Mulhouse, 1952 : 55)

Matériel examiné :
– Prov. de Granada, N 342 × Rio Baza, 7.-9.VII.1985, leg. G. BALDIZZONE et E. TRAUGOTT-OLSEN.
– idem, N 342, 8 km al este de Baza, 11.VII.1985, leg. G. BALDIZZONE et E. TRAUGOTT-OLSEN.

Note : L'espèce, dont la bionomie est inconnue, a été recueillie jusqu'à présent seulement en Algérie et Tunisie ; elle est donc nouvelle pour la faune espagnole et pour l'Europe.

Références bibliographiques

BALDIZZONE, G. 1982. – Contribuzioni alla conoscenza dei *Coleophoridae*. XXVI. I *Coleophoridae* raccolti dalla spedizione del Museo di Budapest in Tunisia nel 1977. *Ann. Hist. nat. Mus. nat. hung.*, **74** : 203-216.

BALDIZZONE, G., 1983. — Contribution à la connaissance des *Coleophoridae*. XXXIV. (Les taxa décrits par H. G. AMSEL). *Andrias*, **3** : 37-50.

BALDIZZONE, G., 1985. — Contribution à la connaissance des *Coleophoridae*. XLII. Sur quelques *Coleophoridae* d'Espagne. (Première partie : description de nouvelles espèces). *Nota lepid.*, **8** (3) : 203-241.

KLIMESCH, J., 1982. — Beiträge zur Kenntnis der Microlepidopteren-Fauna des Kanarischen Archipels. *Vieraea*, 11 [1981] n° 1/2, 21-50.

TOLL, S., 1952 (1953). — Rodzina *Eupistidae (Coleophoridae)* POLSKI. *Doc. phys. Polon.*, **32** : 1-292.

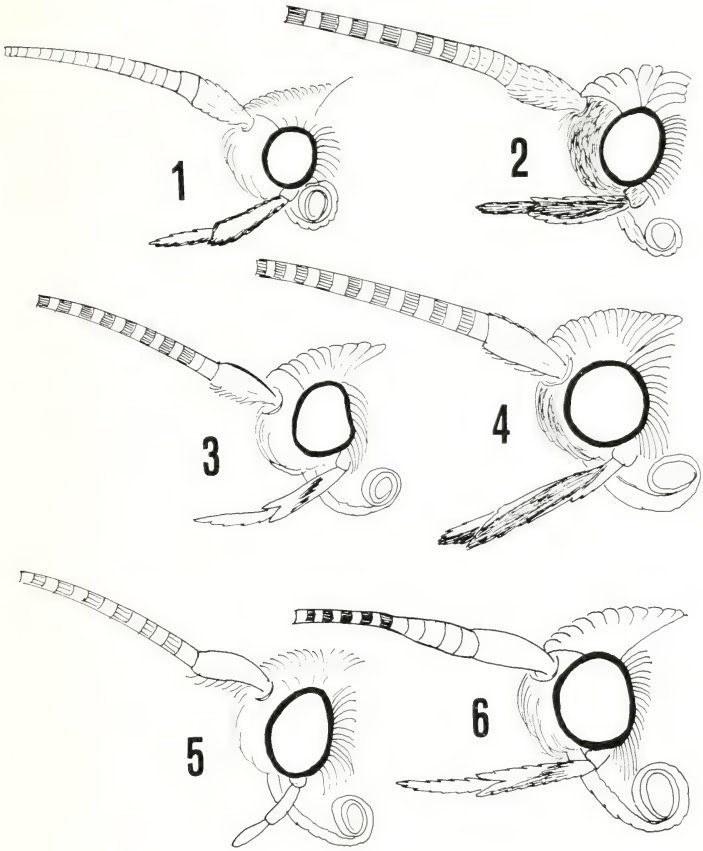


Fig. 1 à 6 : têtes : 1) *C. sciurella* n. sp., 2) *C. jynxella* n. sp., 3) *C. beticella* n. sp., 4) *C. teneriffella* n. sp., 5) *C. aliena* n. sp., 6) *C. vivesella* n. sp.

Fig. 7 à 9 : *C. hiberica* BALDIZZONE : 7) genitalia femelles (PG Bldz 7513) «Prov. Granada, Sierra Nevada, Camino de Capileira, 1250 m, 14.VII.1985, G. Baldizzone y E. Traugott-Olsen», 8) idem, particulièrement grossis, 9) abdomen.

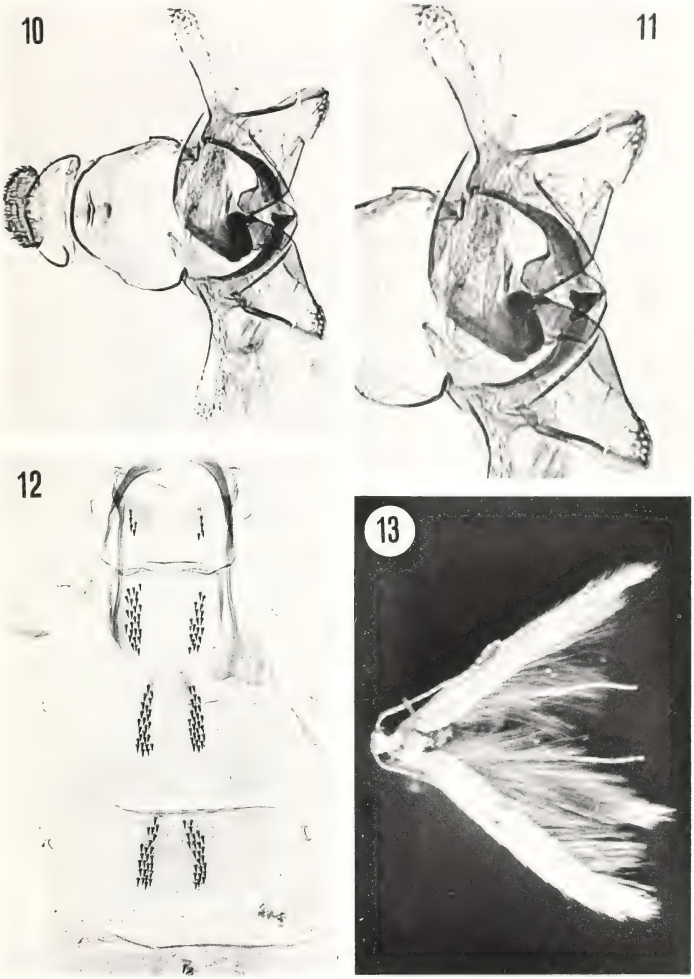


Fig. 10 à 13 : *C. aliena* n. sp. : 10) genitalia mâles (holotype), 11) idem, particulièrement grossis, 12) abdomen, 13) imago.

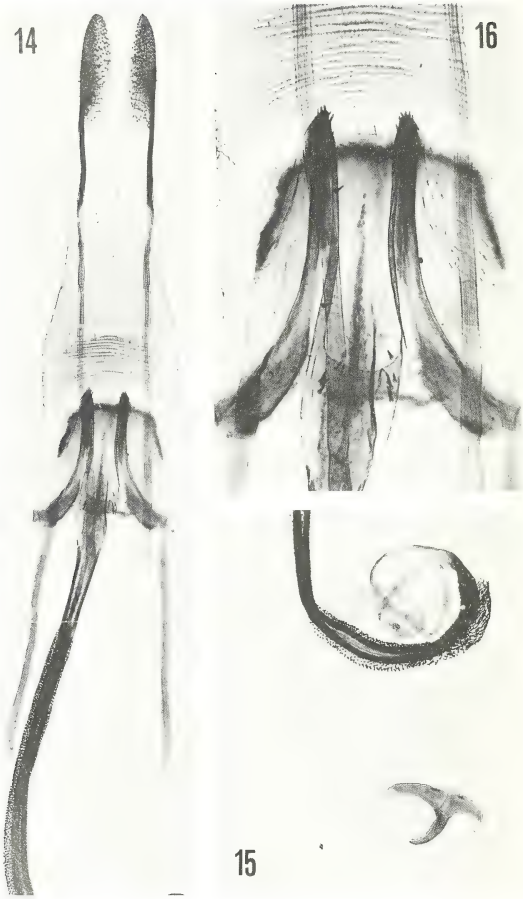


Fig. 14 à 15 : *C. nevadella* BALDIZZONE, genitalia femelles (PG Bldz 7483) «Sierra Nevada) Camino de la Veleta, 1600 m, 19.VII.1985, leg. G. Baldizzone y E. Traugott-Olsen».

Fig. 17 à 20 : *C. vivesella* n. sp. : 17) genitalia mâles (PG Bldz 7721-paratype), 18) idem, particulièrement grossis, 19) abdomen, 20) imago.

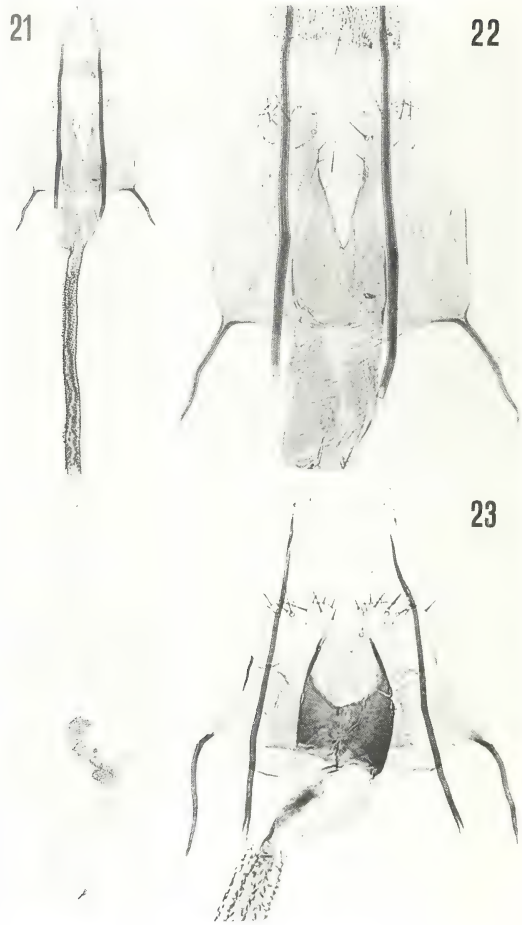


Fig. 21 et 22 : *C. vivesella* n. sp. : genitalia femelles (PG Bldz 7732-paratype).
Fig. 23 : *C. beticella* n. sp. : genitalia femelles (PG Bldz 7673-paratype) particulièrement grossis.

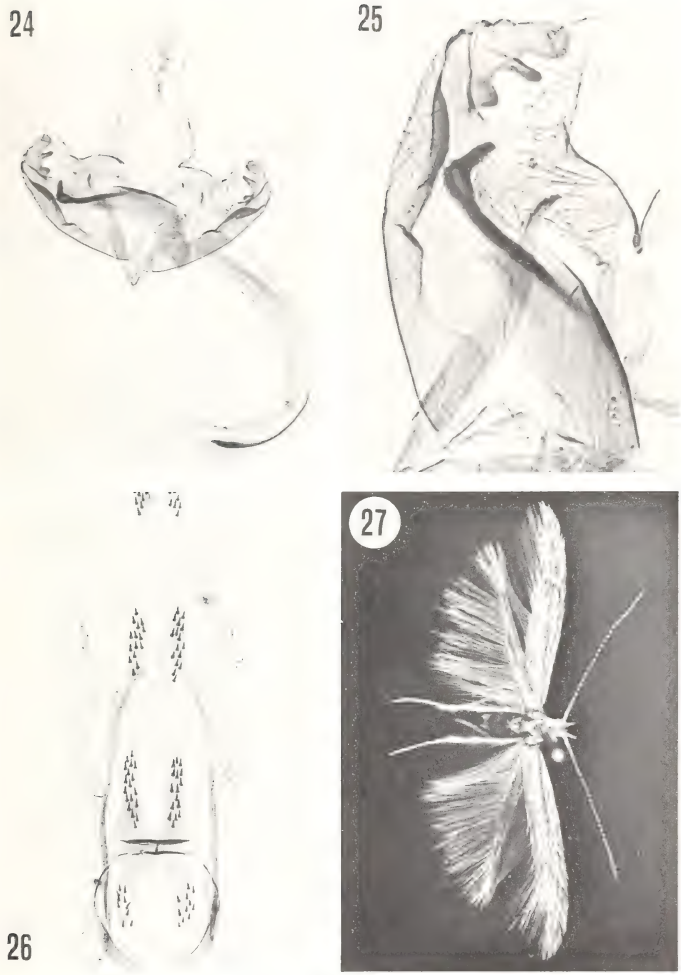


Fig. 24 à 27 : *C. jynxella* n. sp. : 24) genitalia mâles (PG Bldz 7062-paratype), 25) idem, particulièrement grossis, 26) abdomen, 27) imago.

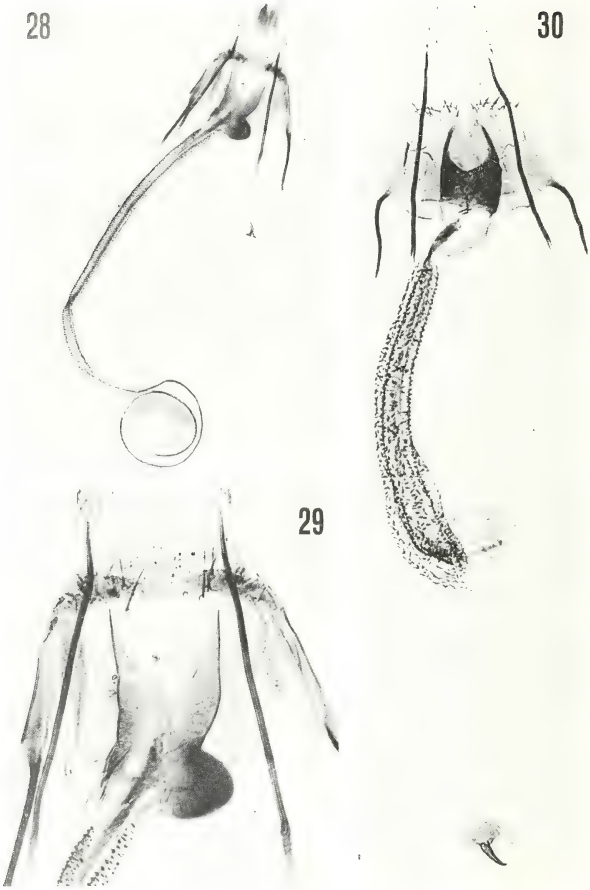


Fig. 28 : *C. jynxella* n. sp. : genitalia femelles (PG Bldz 4142-paratype).
Fig. 29, idem, particulièrement grossis.
Fig. 30 : *C. beticella* n. sp. : genitalia femelles (PG Bldz 7673-paratype).

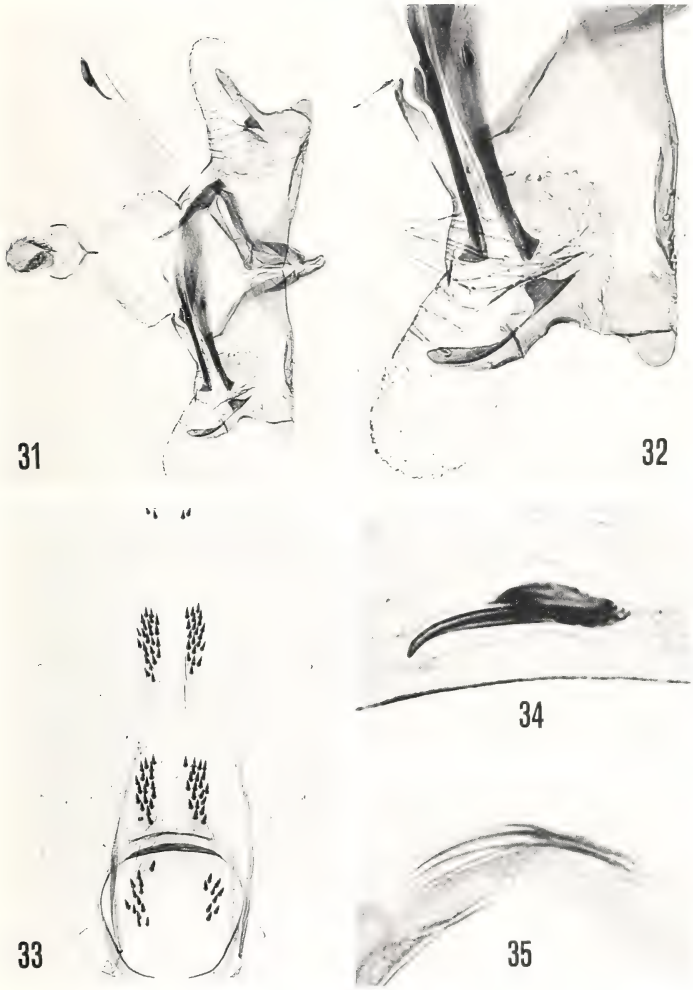


Fig. 31 à 34 : *C. teneriffella* n. sp. : 31) genitalia mâles (PG Bldz 7884-holotype).
Fig. 32 : idem, particulièrement grossis, 33) abdomen, 34) *cornutus* très grossi.
Fig. 35 : *C. sciurella* n. sp. : *cornutus* très grossi.

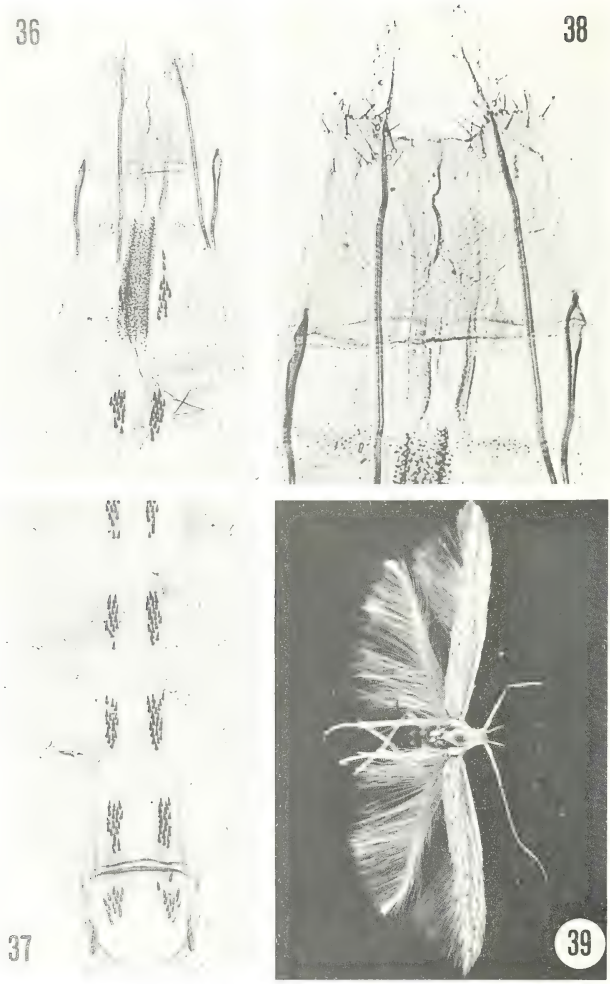
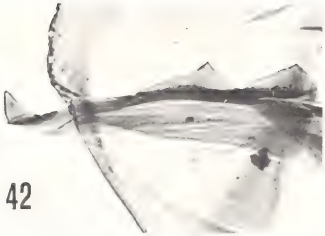


Fig. 36 à 39 : *C. teneriffella* n. sp. : 36) genitalia femelles (PG Bldz 2814-paratype), 37) abdomen, 38) genitalia femelles particulièrement grossis, 39) *imago*.



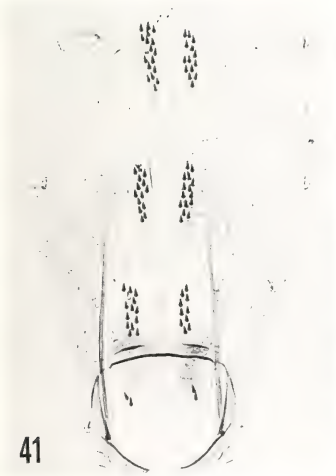


Fig. 40 à 44 : *C. beticella* n. sp. : 40) genitalia mâles (PG Bldz 7680-paratype), 41) abdomen, 42) édéage très grossi, 43) cornuti très grossis, 44) *imago*.

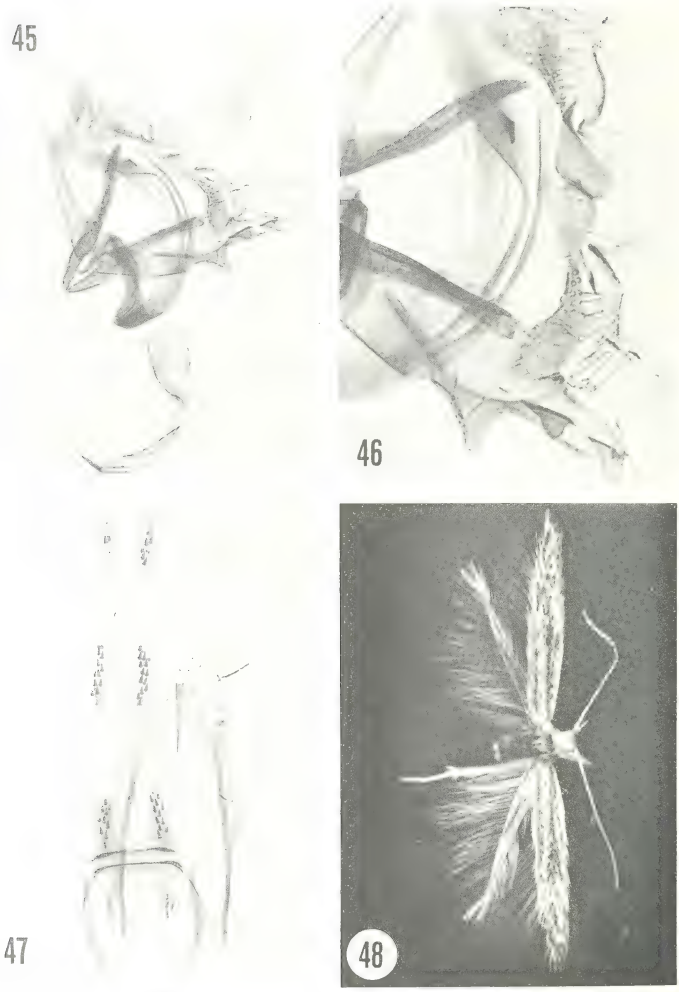


Fig. 45 à 48 : *C. sciurella* n. sp. (PG Bldz 7747-holotype) : 45) genitalia mâles, 46) idem, particulièrement grossis, 47) abdomen, 48) *imago.*

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Notes on *Plebicula dorylas magna* BÁLINT, 1985 (Lepidoptera, Lycaenidae)

Zsolt BÁLINT

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Recently, I described a new subspecies of *Plebicula dorylas* (D. & S., 1775) from the Eastern Carpathians, under the name *magna* (BÁLINT, 1985). Figures of the male genitalia were published later, together with details of additional specimens discovered in the collections of the Naturhistorisches Museum, Wien and the Zoologische Staatssammlung, München (BÁLINT, 1986).

Since the original description, I have come across a number of interesting literature references to *dorylas* in the Carpathians.

HORMUZAKI (1897) recorded *dorylas* from North Moldva (formerly South Bukowina, which was the most easterly province of the Austro-Hungarian Empire), although under the name *hylas* ESP. According to his observations, this species was widespread in the subalpine and alpine regions, but virtually absent from the hill-country and low mountain areas, where it occurred only near Csernovic (Černovici). HORMUZAKI described the Moldavian specimens : "... Alle ♂ sind gross (bis 37 mm) ; auf der Unterseite ist der weisse Saum auffallend breit, der von diesem ausgehende Wisch füllt die Zelle 3 fast aus und reicht über den dritten Medianast ; der weisse Mittelfleck sehr ansehnlich, alle Randflecke verloschen, die dunkeln gewöhnlich verschwunden, die rothen bloss auf den Hinterflügeln durch kleine, getrennte, nicht schwarz gesäumte Dreiecke angedeutet, an deren Aussenseite unbedeutende bräunliche Punkte im weissen Saume stehen. Augenflecke auf den Hinterflügeln bisweilen nur durch kleinere Punkte angedeutet, fehlen vollständig bei den alpinen Stücken, die auch sehr breite Fransen besitzen (var. *armena* STGR.). Das einzige, 29 mm spannende ♀ hat auf der Unterseite deutliche Augen, aber auch eine sehr ausgebreitete weisse Randzeichnung ; Oberseite schwarzbraun, ohne blauen Anflug, nur auf den Hinterflügeln mit zwei ganz verloschenen, trüb bräunlichrothen Analflecken. Fransen breit, hellbraun". HORMUZAKI identified his specimens as var. *armena* STGR. (see SEITZ, 1909). However, in Asia Minor and in Armenia, *dorylas* is smaller and has longer wings with different underside markings. His description fits *magna* so well that it is clear that HORMUZAKI's data refer to this subspecies.

CZEKELIUS (1897) and ABAFI-AIGNER, PÁVEL & UHRYK (1896) referred to *dorylas* from Gyilkostó, Transsylvania (Rumania : Lacu Roşu). Twenty years later, CZEKELIUS (1917) described two aberrations of *hylas*. One of them was called ab. geographica *magna*! The great size of the specimens from the Eastern Carpathians struck him. He wrote the following : "In beiden Geschlechtern um ein Drittel grösser als die Stammform. Die Unterseite auffallend bunt und kontrastreich. 15 ♂♂ und 8 ♀♀ unter sich gleich gross, keine Übergänge zur Stammform...". Unfortunately CZEKELIUS described his *magna* as an aberration, so his authorship is invalid according to the Rules of Zoological Nomenclature.

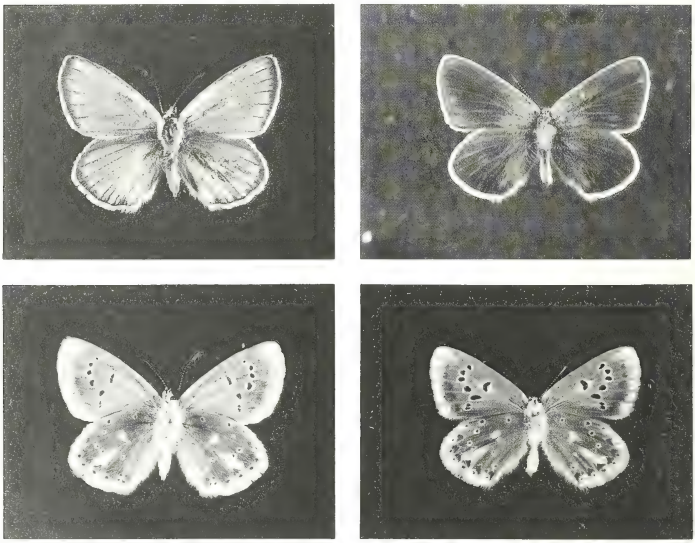

Fig. 1. Holotype (♂) and paratype ♀ (Gyergyó, Csiszér) of *Plebicula dorylas magna* BÁLINT.

During the 7th Hungarian Entomological Congress, Sándor SIMONYI and Lajos SZÉCSÉNYI (members of the Societas Entomologica Hungariae) exhibited the material that they had collected in Transsylvania. Among the butterflies, was a large male specimen of *dorylas*. It was collected with two further specimens in the Szalárd (Salărd) Valley, in the Görgényi (Gurghiu) Mountains by S. SIMONYI. HALTRICH (1982) also recorded *dorylas* from the

same valley, flying in mesophilous meadows. This establishes that *magna* occurs not only on limestone (BÁLINT, 1985), but also on volcanic basic rock. This is also confirmed by a specimen of *magna* that I found in the collection of Baron Dr. LIPTHAY while arranging the *Lycaena* material. This specimen has three data labels: "Hargita (Farkas-hágó), 1100 m, 1934.VII.11, DIÓSZEGHY" (DIÓSZEGHY's handwriting); "*Lyc. hylas* Es. f. geographica *magna* CZEK". (LIPTHAY's handwriting); "coll. LIPTHAY" (printed). The Hargita (Harghita) mountains rise south of the Görgényi Mountains, both of which are volcanic.

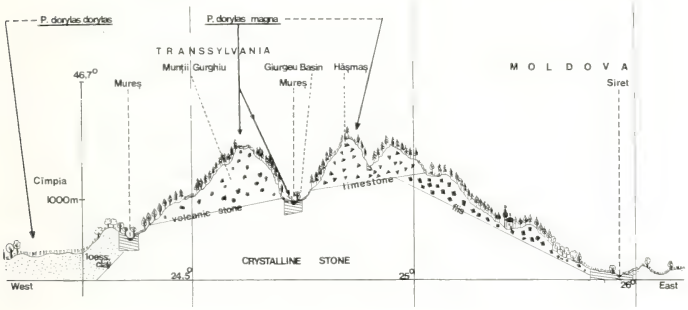

Fig. 2. Sectional drawing of the Eastern Carpathians (at 46,7°N) – The habitat of *Plebicula dorylas dorylas* D. & SCH. and *Plebicula dorylas magna* BÁLINT.

Many recent publications refer to *Plebicula dorylas* from the Eastern Carpathians (BARBU & COICHIA, 1980; BÁLINT, 1980, 1981, 1983; KOVÁCS & KOVÁCS, 1976-1977; KÖNIG, 1975 and POPESCU-GORJ, 1964, 1970). All of these populations are referrable to ssp. *magna* and not to the nominate race. All the available information supports my observation that *P. dorylas magna* is univoltine and flies from the middle of June to the end of August in the mountains (BÁLINT, 1985), while *P. dorylas dorylas* has two broods and flies in Transsylvania, mainly on the Mezőség (Cîmpia) (BÁLINT, 1985; KÖNIG, 1964; POPESCU-GORJ, 1964 and SZÉKELY, 1985) (fig. 2). However, the bivoltine form enters the valleys of the North Persányi (Perşani) Mountains and flies together with *magna*, e.g. in the Vargyasi (Virghişului) Gorge. Here, in some places, they form hybrid populations. It appears that *Parnassius apollo transsylvanicus* SCHWEITZER, 1912 often flies together with *Plebicula dorylas magna*. It is not yet clear how far the exact distribution extends.

Acknowledgements

I wish to express my gratitude to my wife Annamária KERTÉSZ for correcting the English manuscript ; to Dr. László GOZMANY for his advice on nomenclatoric questions and to Sándor SIMONYI and Lajos SZÉCSÉNYI for their kind help. I am also thankful to Dr. Wolfgang DIERL and to Dr. Friedrich KASY for allowing me to see their Museums' material and to László PEREGOVITS for taking the photos of the types.

References

ABAFI-AIGNER, L., PÁVEL, J. & UHRYK, N., 1896. — Fauna Regni Hungariae, Arthopoda (Insecta : Lepidoptera). *K. M. Természettudományi Társulat* : 17.

BARBU, A. & COICHIA, V., 1980. — Catalogul colecţiei de Lepidoptere "N. Delvig" a Muzeului Judeţean Braşov. *Cumidava* XII/4, *Ştiinţele naturii Braşov* : 94.

BÁLINT, Zs., 1980. — Adatok a nagylepkék elterjedéséhez Erdélyben (Lepidoptera : Rhopalocera). *Fol. ent. hung.* XLI/2 : 366.

BÁLINT, Zs., 1981. — Adatok a nagylepkék elterjedéséhez Erdélyben II. (Lepidoptera). *Fol. ent. hung.* XLVII/1 : 232.

BÁLINT, Zs., 1983. — Újabb adatok a Keleti-Kárpátok nagylepkefaunájának ismeretéhez (Lepidoptera). *Fol. ent. hung.* XLIV/2 : 325.

BÁLINT, Zs., 1985. — *Plebicula dorylas magna* nov. ssp. (Lep. : Lycaenidae) from the Eastern Carpathians, Rumania. *Neue Ent. Nachr.* 14 : 14-20.

BÁLINT, Zs., 1986. — Egy új boglárkalepke alfaj a Keleti-Kárpátokból : a *Plebicula dorylas magna* BÁLINT, 1985 (Lepidoptera : Lycaenidae). *Fol. ent. hung.* XLVII : 210-212.

CZEKELIUS, D., 1897. — Kritisches Verzeichnis der Schmetterlinge Siebenbürgens. *Verh. und Mitt. des Siebenb. Ver. für Naturwissenschaften zu Hermannstadt,* XLVII : 12.

CZEKELIUS, D., 1917. — Beiträge zur Schmetterlingsfauna Siebenbürgens. *Verh. und Mitt. des Siebenb. Ver. für Naturwissenschaften zu Hermannstadt,* LXVII : 12.

HALTRICH, A., 1982. — Beiträge zur Kenntnis der Rhopaloceren des Salárd-Tales (Gurghiu-Gebirge, Ostkarpaten). *Studii şi Communicari* II : 356.

HORMUZAKI, V. C., 1897. — Die Schmetterlinge (Lepidoptera) der Bukowina. *Zool. bot. Gesellschaft,* XLVII : 135.

KOVÁCS, S. & KOVÁCS, Z., 1976-1977. — Adatok a Brassó-Háromszéki medence és környéke lepkefaunájának ismeretéhez. *Aluta, Muzeul Sf. Gheorghe* : 294.

KÖNIG, F., 1975. — Catalogul colecţiei de lepidoptera a Muzeului Banatului. Timişoara : 216.

POPESCU-GORJ, A., 1964. — Catalogue de la collection de lépidoptères "Prof. A. Ostrogovich" du Muséum d'Histoire Naturelle "Grigore Antipa" Bucarest. Bucureşti : 243.

POPESCU-GORJ, A., 1970. — Date privind Lepidoptere de la Lacul Roşu şi Cheile Bicazului. *Studii şi Cercetari, Piatra Neamţ* : 348.

SEITZ, A., 1909. — Die Gross-Schmetterlinge der Erde — des Palearktischen Faunegebietes, I Abt. Band 1. Stuttgart, Fritz Lehmann's Verlag : 314.

SZÉKELY, L., 1985. — Data to the Macrolepidoptera Fauna of the surroundings of Tirgu-Mureş (Central Transsylvania). Manuscript.

Book reviews – Buchbesprechungen – Analyses

O. KUDRNA : Butterflies of Europe. 1. Concise Bibliography of European Butterflies. Aula Verlag, Wiesbaden, DM 248.-

The book under review represents the first – long awaited and much delayed – volume of a planned eight volumes monograph on the butterflies (Papilionoidea) of Europe. After an author's preface and introduction, it contains some 6000 bibliographic references, alphabetically arranged and progressively numbered. They represent something like one third of all publications on European butterflies published in the period between ca. 1900 to 1984. The starting point of this bibliography has been chosen because the period between 1750 and 1900 has already been comprehensively covered by other bibliographies. The volume is closed by a subject index where some key references (systematic, geographical and selected key-words) are listed by reference number of subject headings.

The book is technically well produced, although it is a pity that technical difficulties have made it impossible to include all diacritical marks, as characteristic of almost every European language. As a matter of fact, making this additional effort could have improved the editorial aspect of the book.

It may be argued that one or another additional reference should have been included or left out, or that the subject index could have been considerably extended. Yet, one can of course make some allowance for the ever increasing amount of published information on European butterflies, that make a comprehensive bibliography covering this century hardly possible even for a well known publisher, like AULA. It is a pity, however, that some countries, such as Switzerland and – to some extent – France, are slightly less covered than others by this bibliography.

If one considers the number of copies of this book that are going to be sold, it is likely that the AULA could even be praised for keeping the price reasonably low. Some serious non-professional students of butterflies, who like many others, will certainly need the book, and whose cooperation is often necessary to produce it, might however find it rather too expensive.

Emilio Balletto

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Notes on the distribution of *Gortyna borelii lunata* FREYER in the Carpathian Basin

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Gortyna borelii PIERRET, 1837 (*leucographa* auct., nec BORKHAUSEN) is an extremely local species, but has a very wide distribution. It is known from England (one locality only), France (Seine-et-Oise, the nominotypical form, Charente, Cher, Deux-Sevres), Spain (Catalonia : Baells, Valada), W. Germany (Baden-Württemberg, Nassau, Pfalz), E. Germany (Thüringen, Leipzig, Halle), Poland, the Carpathian Basin and S.W. Siberia. Unfortunately, many of the European populations have already disappeared. Populations in Central Europe are referrable to ssp. *lunata* FREYER, 1839, which is larger than the nominate subspecies.

In this note, the distribution of *lunata* and its foodplants in the Carpathian Basin is discussed.

I. The foodplants of *G. borelii lunata* FRR. in the Carpathian Basin.

Clearly, populations of the moth can only occur where the foodplants occur and so, first, the known distributions of the foodplants are presented. For the Carpathians and Carpathian Basin, three species are mentioned in the literature and a fourth is discussed here.

1. *Peucedanum longifolium* L. : Grows only on limestone. Occurs on the Balkan Peninsula, but also in the Carpathian Basin and the Southern Carpathians (Kazan Gorge, Mehadia, Băile Herculane, Cserna Valley) up to about 1000 m. This is the only known foodplant of the highest occurring European *borelii* population, of the Domogled, a mountain near Mehadia (F. KÖNIG, 1941).

2. *Peucedanum officinale* L. : This plant is the character species of the association *Peucedano-Galatelletum* ZÓLYOMI et TALLÓS (*Peucedano-Asteretum* auct.). It is the only known foodplant of the *borelii* populations of the Great Hungarian Plain. Apart from the sandy districts of the territory situated between the Rivers Tisza and Danube, and the Nyirség, *P. officinale* was widely distributed in the Great Hungarian Plain in the forest-steppe zone in the foothills of the Mátra, Bükk and Zemplèni Mountains, the Lesser

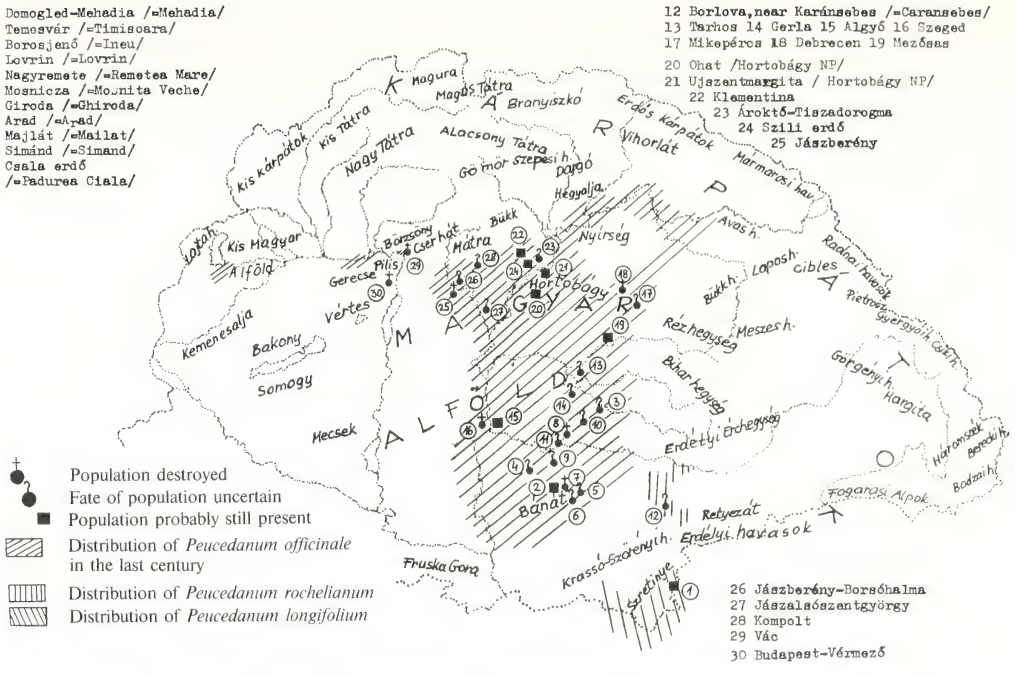

Fig. 1. Distribution of *Gortyna borelii lunata* FRR. and its foodplants in the Carpathians and Carpathian Basin.

Hungarian Plain (near Lake Fertö) and at the Danube Bend (Esztergom). Today, it can be found very locally, mostly in the clearings of the forests on basic soils, especially in the Hortobágy National Park.

3. *Ferula sadleriana* Ledeb. : This is an endemic and very local species of the Carpathian Basin, growing only in a few rocky places at low altitude : Pilis Mts., Gerecse Mts. (Pisznice), Nagymaros (Ördöghegy), Bükk Mts. (Bélkő), Tornai Karst, Transsylvania : Tordai and Bojcai (?) – hasadék (gorge). Probably a preglacial relict (Soó, 1966). This plant is mentioned by various authors as a potential foodplant, but this has never been confirmed. Indeed, *F. sadleriana* seems not to be a foodplant of *G. borelii lunata* Frr., because no moth has ever been captured where the plant is known to occur.

4. *Peucedanum rochelianum* Heuff. : This is also an endemic plant of the Carpathian Basin, and must be considered a potential foodplant of the *borelii* populations in the Bánát (S.E. part of the Carp. Basin). A single specimen of *borelii* is known from Borlova (near Karánsebes, Bánát) (in the Natural History Museum, Vienna). *P. rochelianum* is considered to have been the only possible foodplant for the larva of this specimen (F. König, pers. comm.).

G. borelii lunata has therefore only two foodplants for certain in the region of the Carpathian Basin : *Peucedanum longifolium* (Mt. Domogled, S. Carpathians) and *P. officinale* (populations of the Carpathian Basin).

Fig. 2. *Gortyna borelii lunata* Frr. ♀, Hungary, Hortobágy Nat. Park, Újszentmargita.

II. The *G. borelii lunata* FRR. populations in the region of the Carpathian Basin and their present status.

1. The population of Mt. Domogled (S. Carpathians, 1190 m).

This was the first known locality for *borelii* in the Carpathians and Carpathian Basin and is the only mountain population. First mentioned by KINDERMANN (1835-36) from nearby Mehadia ; later by ABAFI-AIGNER (1907) and by KÖNIG (1941). It was also collected by KÖNIG in 1962. It probably still occurs very locally on the Domogled. According to Z. VARGA (1964), this population is a relict species of a drier period of the Quaternary.

2. Populations of the Bánát (S. E. Carpathian Basin, in Romania).

A large population was known near Temesvár (= Timisoara), the first specimens being taken in 1938 (KÖNIG, 1941, 1975, 1978). A number of other isolated localities are also known : Borosjenö (= Ineu, Arad County) (LIPTHAY, 1931 ; DIÓSZEGHY, 1932) ; Lovrin (= Lovrin) (KÖNIG, 1941) ; Arad, Nagyremete (= Remetea Mare), Mosnicza (= Mosnita Veche), Giroda (= Ghiroda) (KÖNIG, 1975) ; Majlat (= Mailat), Simánd (= Simand), Csala erdő (= Padurea Ciala) (KÖNIG, 1978) and Borlova near Karánsebes (= Caransebes), (KÖNIG, in litt.).

Unfortunately, most of these localities have already been destroyed. The most recent records are : Nagyremete (1971), Simánd (1972) and in one locality only near Temesvár (1985, leg. KÖNIG).

3. Populations of Békés-Csongrád County (S.E. Hungary).

Only sporadic occurrences are known : Tarhos, Gerla (RONKAY, VOJNITS & GYULAI, 1983), Algyö in 1979 and one specimen taken in the centre of the city of Szeged in 1981 (KOVÁCS, 1982-83). It is unlikely that any population has survived near Szeged.

4. Populations near Debrecen (E. Hungary).

Only a few specimens known : Mikepércs, Mezösas (leg. SARKADI, coll. VARGA) and 3 at Debrecen in 1955 (VARGA, 1957 ; RONKAY, VOJNITS & GYULAI, 1983).

The species probably no longer occurs at Debrecen, as the foodplant has been destroyed on the banks of the Tócó. The record at Mezösas demonstrates the link to the populations of Békés County and the Bánát.

5. Populations of the Hortobágy (E. Hungary).

There are two local, but large populations occurring in the clearings of the forests near Ujszentmargita and Ohat (near Egyek). The two forests are the

remains of the true "puszta with forest" (forest-steppe zone) and are protected areas belonging to the Hortobágy National Park.

The moth was discovered in the Ohat forest in 1948, by KOVÁCS (1955), but the Ujszentmargita forest population was first noted in 1971 by the author (GYULAI, 1974). *G. borelii* is a frequent species in these forests and these populations are probably the largest and certainly the most seriously protected populations in the Carpathian Basin (RONKAY, VOJNITS & GYULAI, 1983).

6. Populations of the Kis-Hortobágy (S. E. Borsod County in N. Hungary).

Two specimens were taken in 1984-85 in a light-trap near Klementina (GYULAI, in print). In the last two years, two large populations of *P. officinale* were discovered by the author, not too far from Klementina (on the bank of the River Tisza and in the Szili forest, near Ároktö-Tiszadorogma). The moth probably occurs in these two localities. Szili forest became a protected area in 1986.

7. Populations of the Jászság (C. Hungary).

KOVÁCS (1955) mentioned the possibility of the occurrence of *borelii* near Jászalsószentgyörgy. Later, it was found by BUSCHMANN (1982, 1985) in the city of Jászberény and at Borsóhalma, not too far from the place mentioned by KOVÁCS. Since then this population has probably been destroyed.

In the past, populations south of the Mátra-Bükk Mts. formed a link between the populations of the Hortobágy and Kis-Hortobágy, and those of the Jászság. This fact is evidenced by the occurrence of *borelii* near Kompolt (Heves County) at light.

8. Populations near Budapest.

Only two old specimens are known : one male, 7th. October 1937, near Vác (NAGY, 1942) and one female, at the end of October 1923, Budapest-Vérmezö (BÁNÓ, 1943). *P. officinale* was also known to occur on the Danube Bend. These populations have certainly been destroyed.

The survival of *G. borelii lunata* FRR. in the Carpathian region is ensured only in the Hortobágy National park and perhaps also in the Kis-Hortobágy and on Mt. Domogled. Unless action is taken, it is likely that all other populations will be destroyed in the near future.

References and bibliography

ABAFI-AIGNER, 1907. — Magyarország lepkéi. Budapest, p. 65.
BÁNÓ, L., 1943. — *Hydroecia leucographa* BKH. Budán *Fol. Ent. Hung.* 8 : 102.

BUSCHMANN, F., 1982. – Adatok Jászberény és környéke nagylepkéinek ismeretéhez. Data to the knowledge of the Macrolepidoptera Fauna of Jászberény and its surroundings. *Fol. Ent. Hung.* 43 (1) : 255-268.

BUSCHMANN, F., 1985. – Jászberény és környékének lepkevilága Jászsági füz. 5-72.

GYULAI, P., 1974. – Az Ujszentmargita-i IBP mintaterület nagylepkéinek ökológiai-faunisztikai vizsgálata. Debrecen, pp. 1-34.

JÁVORKA, S. & CSAPODY, V., 1975. – Iconographia Florae Partis Austro-Orientalis Europae Centralis. Budapest, p. 380.

KOCH, M., 1984. – Wir bestimmen Schmetterlinge. Leipzig, Radebeul, p. 439.

KOVÁCS, L., 1955. – The Macroplepidoptera Characteristic to our Sandy Districts. *Ann. Hist.-Nat. Mus. Nat. Hung.* 6 : 335-336.

KOVÁCS, L., 1955. – The Occurrence in Hungary of *Hydroecia leucographa* BKH. with new Data on its Life History. *Acta Zool. Ac. Sci. Hung.* 1 (3-4) : 324-329.

KOVÁCS, S. T., 1982-83. – Jellegzetes Dél-Alföld-i ökoszisztémák nagylepke együttesei (Csongrád megye). Typische Schmetterlingsensemble (Lepidoptera) der Ökosysteme im Alföld Ungarns (Komitat Csongrád). *Móra F. Múz. Évk.* I : 453-466.

KÖNIG, F., 1941. – A *Hydroecia leucographa* BKH. ujabb lelöhelyei a Bánságban. Neue Fundorte von *H. leucographa* BKH. im Banat.

KÖNIG, F., 1959. – Beiträge zur Kenntnis der Lebensweise von *H. leucographa* BKH. *Fol. Ent. Hung.* 6 (32) : 481-493.

KÖNIG, F., 1960. – Erfolgreiche Zuchten von *H. leucographa* BKH. *Ent. Zeitschr.* 70 (6-7) : 1-7.

KÖNIG, F., 1961. – Erfolgreiche Eizuchten von *Hydroecia leucographa* BKH. *Ent. Zeitschr.* 70 (6-7) : 69-73.

KÖNIG, F., 1961. – Studiu asupra lepidopterelor carasteristice pentru rulastinile si terenurile inundabile de pe Sesul Banatului. *St. cerc. biol. si St. Acad. R.P.R.* 8 (3-4) : 267-285.

KÖNIG, F., 1965. – Cercetari entomologice in rezervatia naturala Muntele Domogled. *Acad. R.S.R., Ocrot. Nat.* 9 (1).

KÖNIG, F., 1975. – Catalogul colectiei de lepidoptere a Muzeului Banatului. Timisoara : p. 163.

KÖNIG, F., 1978. – Lepidoptere pe cale de disparitie in Judetul Arad. Einige bedrohte Schmetterlingsarten im Kreis Arad. *Ocrot. nat. med. inconj.* 22 (2) : 127-132.

NAGY, L., 1942. – A *Hydroecia leucographa* BKH. uj lelöhelye Vácon. Ein neuer Fundort von *Hydroecia leucographa* BKH. in Ungarn. *Fol. Ent. Hung.* 7 : 96-97.

OROZCO i SANCHÍS, A. and R., 1985. – *Gortyna borelii* (PIERR. 1837), nou per a la Fauna Ibérica, i confirmacio de la presencia a Catalunya d'*Episema glaucina* (ESP., 1789) (Lep. Noct.). *Treb. Soc. Cat. Lep.* 7 : 49-50.

POPESCU-GORJ, A., 1964. – Catalogue de la collection de Lepidoptères «Prof. A. OSTROGOVICH». Bucarest, p. 189.

RONKAY, L., VOJNITS, A., GYULAI, I., GYULAI, P., 1983. – Macrolepidoptera from the Hortobágy National Park in : The Fauna of the Hortobágy Nat. Park. *Publ. Hung. Ac. Sci.* : 227-240.

SOÓ, R., 1966. – A magyar flóra és vegetáció rendszertani-növényföldrajzi kézi könyve II. Synopsis Systematico – Geobotanica Florae Vegetationisque Hungariae II. Budapest, pp. 481-482.

STAUDINGER, O. & REBEL, H., 1901. – Catalog der Lepidopteren des Palaearctischen Faunengebietes. Berlin, p. 186.

VARGA, Z., 1957. – Debrecen és környéke nagylepke faunája. Die Gross-Schmetterlingfauna von Debrecen und Umgebung. *Fol. Ent. Hung.* 10 (8) : 235-258.

WARNECKE, G., 1959. – Über die Verbreitung von *Hydraecia leucographa* BKH., sowie Beschreibung einer Neuen Form. *Ent. Nach. Österr. u. Schw. Ent.* 11 (1).

WARREN, W., 1906. – In Seitz, A. : Die Gross-Schmetterlinge der Erde. Stuttgart, p. 226.

Book reviews – Buchbesprechungen – Analyses

B. GOATER : British Pyralid Moths – A Guide to their Identification. 16 × 22 cm, 175 pp., 9 colour plates, 12 figs, Harley Books, Martins, Great Horkesley, Colchester, Essex C06 4AH, England, 1986, £ 18.95 (ISBN 0-946-58908-9).

Beirne's famous work "British Pyralid and Plume Moths" was published more than 30 years ago, and has been out of print for some time. Since its publication, more than 30 species of Pyralidae have been added to the British list. A modern revision was badly needed, and the present publication supplies this want. The book provides very good colour plates, comprising photographs of the 208 British species, from which entomologists will easily be able to identify most of their material. In the case of difficult species, the text points out the important wing pattern characters and other distinguishing features. In many cases, text figures illustrate wing venation or genitalia.

The good quality of the colour plates has allowed the text to be kept short, without losing too much information. For each species, a short description of the adult is given, together with some data on the early stages, the habitat, and distribution in Great Britain. The author uses an up-to-date nomenclature. The book contains a check-list of the British Pyralidae species, a glossary, and indexes of scientific insect and foodplant names. It is hoped that a similar book on the British Plume Moths will follow soon.

W. O. De Prins

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Possible hybrids between *Lysandra bellargus* ROTT. and *L. hispana* H.-S. (Lepidoptera, Lycaenidae)

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Summary

The authors describe two possible hybrids of *Lysandra bellargus* ROTT. × *Lysandra hispana* H.-S.

In 1845, ZELLER described a new species of lycaenid butterfly, *Polyommatus polonus*, of which he had received three specimens collected near Poznan (Posen) in Poland (at that time East Prussia). SEITZ (1906) included *polonus* among the aberrations of *Lysandra bellargus* "found only in certain districts in East Prussia, Russia, Syria and Spain". Form *polonus* was subsequently reported from various parts of the Alps (VERITY, 1943 ; DE LESSE, 1961), Pyrénées (DE LESSE, 1961) and central Italy (VERITY, 1943). A specimen from central Germany is shown in FORSTER and WOHLFAHRT (1955). The following named taxa are considered to correspond to the form *polonus* : *Polyommatus corydon* SCHIFF. ab. *calydonius* (LOWE) (WHEELER, 1903), *Lycaena coridon* PODA ab. *hafneri* (PREISSECKER, 1908), both attributed by VERITY to the species *bellargus*, and *Agriades coridon* PODA, form *samsoni* (VERITY, 1920), described as an "ancestral" form of *coridon*, and perhaps one of the two insects described by VERITY (1920) as *Agriades thetis* ROTT. ab. *petri*.

DE LESSE (1960, 1961) concluded from his chromosome analyses that these forms, like others ascribed to the genus *Lysandra* as new species, "ancestral forms", aberrations or varieties, are in fact hybrids of *L. bellargus* × *L. coridon* (as had been suggested in the past). DE LESSE also ascertained that the form reported relatively frequently and regularly from central Italy and the Abruzzi region (ZANGHERI, 1971 ; TEOBALDELLI, 1976), which VERITY (1939, 1943) had erroneously classified as a race (*italglauca*) of the Middle Eastern species *L. syriaca* TUTT, is actually also a hybrid of *L. bellargus* × *L. coridon*. DE LESSE (1960, 1961) found identical variations of the chromosome pattern in a specimen of *polonus* and five *italglauca*, with chromosome number ranging from 51 to 72, therefore intermediate between bellargus (n = 45) and *coridon* (n = 87-92 ; n = 87-88 in the Italian populations (HIGGINS, 1975),

but closer to *bellargus*, and in any case very different from *syriaca* (n = 24). This variability of the genetic material, together with the spontaneous local morphological variations that are so common in *L. coridon*, especially in Spain, independently of the chromosome number, explains the variability of the phenotype and the virtually continuous range of intermediate taxa.

Generally speaking, the colour of the upper wing surface is intermediate between *bellargus* and *coridon*, and is often described as similar to that of *Agrodiaetus damon* SCHIFF., with a more or less well-marked greenish tinge. There is a dark marginal border of variable width and a number of premarginal dots of variable size, more or less merged with the dark border. The underside may be more similar to *bellargus* (*polonus, calydonius*) or to *coridon* (*hafneri, samsoni*). The identification of possible female hybrids is very uncertain, as the colour of the upperside is not distinctive in this sex. TUTT (1910) reported what he claimed to be a female of *polonus* and VERITY (1943) a female of *italglauca*.

Most known cases were captured from mid-June to mid-July, between the flight period of the first brood of *bellargus* and that of the single brood of *coridon*.

A last problem to consider is that of the possible occurrence of natural hybrids between *L. bellargus* and *L. hispana* H.-S. and how they could be differentiated from hybrids *bellargus* × *coridon*. On account of the close resemblance between *hispana* and *coridon*, no distinguishing character can be expected in the external features of these hybrids, although the appearance of the underside may be suggestive. Dissection of the genitalia is also of no help, on account of the similarities between the two species, nor can chromosome studies be expected to offer any valuable clue because the chromosome number is very similar in *coridon* (n = 87-92) and *hispana* (n = 84). For want of finer diagnostic procedures, the only possibility for deducing the other parent of apparent *bellargus* hybrids is to check for the absence of either *coridon* or *hispana* in the locality where the specimen was taken. With this criterion in mind, it can be concluded that one of the two specimens of *petri* (the one collected at low altitude) described by VERITY (1920, 1943) and the one described by DE LESSE (1949, 1961) are probably hybrids of *bellargus* × *hispana*.

In 1980 we described two apparent hybrids of *L. bellargus* : *bellargus* × *coridon*, now in the G. LEIGHEB collection, Novara, Italy, and *bellargus* × *hispana*, now in the V. CAMERON-CURRY collection, Turin, Italy (CAMERON-CURRY, V., LEIGHEB, G. and CAMERON-CURRY, P., 1980).

The apparently greater rarity of *bellargus* × *hispana* as compared with *bellargus* × *coridon* hybrids seems hard to explain : *bellargus* and *hispana* are

both bivoltine and the two generations fly together. The chance of intra-specific pairings would therefore reasonably be expected to be greater in the case of *bellargus* and *hispana* than in the case of *bellargus* and *coridon*. Hybrids between the latter two species are believed to result from pairings between the second generation of *bellargus* and the only generation of *coridon*.

That natural hybrids of *bellargus* × *hispana* may not be quite so exceptional as formerly believed is suggested by the capture of two further possible hybrids (STELLANELLO, Savona, 9.VI.1979, leg. V. CAMERON-CURRY).

1st. specimen

Forewing 18 mm. Upperside colour dullish "damon blue". Marginal black line thin (0.2 mm). Fringes white, faintly chequered (thin striae of black hairs at the ends of veins 2, 3, 4, 5 and 6 on forewing and of veins 3, 4, 5 and 6 on hindwing). Upper hindwing antemarginal dark spots well separated from black border, large in spaces 2, 3, 4, 5 and 6, small in spaces 1b and 1c. Underside forewing general ground colour greyish. Underside hindwing general ground colour greyish brown. All usual underside markings, faintly white-ringed.

2nd. specimen

Forewing 16 mm. Upperside colour dullish "damon blue". Marginal black line thin (0.2 mm). Fringes white, faintly chequered (very thin striae of black hairs at the ends of veins 2, 3, 4, 5 and 6 on forewing and of veins 2, 3 and 5 on hindwing). Upper forewing indistinct antemarginal dark spots in spaces 2, 3, 4, 5 and 6. Upper hindwing antemarginal dark spots well separated from black border, large in spaces 2, 3, 4, 5 and 6, small in spaces 1b and 1c. Underside forewing general ground colour greyish. Underside hindwing general ground colour greyish brown. All usual underside markings, white ringed.

It is interesting to note that the colour of the hybrid described in 1980, which at the time of capture showed a rather metallic sheen, has now dulled and is indistinguishable from that of the two hybrids described here.

References

BENINI, G., 1978. – Un caso di ibridismo : *Lysandra bellargus* ROTT. × *Lysandra coridon* PODA. *Rivista entomologica*, **3** : 9-11.

CAMERON CURRY, V., LEIGHEB, G., CAMERON CURRY, P., 1980. — Due ibridi di *Lysandra bellargus* ROTT., *Bollettino Società Entomologica Italiana*, **112, 1-2** : 41-42.

FORSTER, W. and WOHLFAHRT, T. A., 1955. — Die Schmetterlinge Mitteleuropas, **2** : 107. Franckh, Stuttgart.

HIGGINS, L. G., 1975. — The Classification of European Butterflies, 162-163. Collins, London.

HIGGINS, L. G. and RILEY, N. D., 1970. — A Field Guide to the Butterflies of Britain and Europe, 92. Collins, London.

LESSE (DE), H., 1949. — Recherches en dehors des chemins battus. Contribution à l'étude des Rhopalocères du Département de la Drôme. *Lambillionea*, 24-30.

LESSE (DE), H., 1960. — Spéciation et variation chromosomique chez les Lépidoptères Rhopalocères. *Ann. Sci. nat. Zool. Biol. anim.*, **2** : 1-223.

LESSE (DE), H., 1961. — Les hybrides naturels entre *Lysandra coridon* PODA et *L. bellargus* ROTT. (Lycaenidae), *Alexanor*, **2** : 22-30.

LESSE (DE), H., 1969. — Les nombres chromosomiques dans le groupe de *Lysandra coridon* PODA (Lep. Lycaenidae). *Ann. Soc. ent. France*, **5** : 469-522.

LESSE (DE), H., 1970. — Les nombres de chromosomes à l'appui d'une systématique du groupe de *L. coridon* (Lycaenidae). *Alexanor*, **6** : 203-224.

MANLEY, W. B. L. and ALLCARD, H. G., 1970. — A Field Guide to the Butterflies and Burnets of Spain, 101-102. Classey, Hampton.

PREISSECKER, F., 1908. — Bespricht unter Vorweisung eine neue Lycaenidenform : *Lycaena coridon* PODA ab. ♂ *hafneri*, nov. ab. *Verh. zool. bot. Ges. Wien*, **58** : 68-69.

SEITZ, A., 1909. — Die Grossschmetterlinge der Erde. *Palaearctic Fauna*, **1** : 315. Lehmann, Stuttgart.

TEOBALDELLI, A., 1976. — I macrolepidotteri del maceratese e dei Monti Sibillini (Appennino Umbro-Marchigiano). Note Appunti speriment. *Entomolog. agraria (Assisi)*, **16** : 134.

TUTT, J. W., 1910. — In VERITY, 1943.

VERITY, R., 1920. — Seasonal Polymorphism and Races of Some European Grypocera and Rhopalocera. Additional Notes. *Ent. Rec.*, **43** : 140-152.

VERITY, R., 1939. — Essai sur la distinction des espèces du groupe *Lysandra coridon* PODA. *Lambillionea*, 210-222.

VERITY, R., 1943. — Le farfalle diurne d'Italia, **2** : 290-292 ; 298-300. Marzocco, Firenze.

WHEELER, G., 1903. — The Butterflies of Switzerland and the Alps of Central Europe, 31. London, Elliott Stock.

ZANGHERI, S., 1971. — Considerazioni generali sui macrolepidotteri dell'Appennino centrale. *Lav. Soc. it. Biogeogr.*, **2** : 301-312.

ZELLER, P., 1845. — *Polyommatus polonus*, eine neue Tagfalterart. *Stett. ent. Zeit.*, **3** : 351-354.

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Hilltopping as a mate location strategy in a Mediterranean population of *Lasiommata megera* (L.) (Lepidoptera, Satyridae)

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Abstract

Data collected on the distribution of male *L. megera* at different elevations in the Old Fort, Corfu town, reveal that they establish territories on hilltops as part of their mate location repertoire. Both the act of hilltopping and perching are regarded as mechanisms to increase the probability of contacts between males and unmated females. Selection of hilltops appears to be unrelated to any bias in the distribution of male or female resources, which are evenly spread over the area studied.

Male *L. megera* are flexible in mate location behaviour. In the process of obtaining mates they both perch and patrol, displaying a range of activity from territorial defence to the more passive acceptance of competitors during longer periods of flight over wider areas (see Dennis 1982). There are clear indications that behaviour varies at both the population and individual levels, relating to environmental (habitat differences ; weather), demographic (population density ; sex ratio), physiological (age of individuals) and genetic (inherited bias) factors. A distinctive aspect of their mate location behaviour, as for other butterflies which also establish territories, is their use of topographic vantage points. Typically, edges of habitats are selected, the territories being sited on patches of bare ground, walls, fences, stones, piles of gravel and other landmarks. This process has been likened to hilltopping by the author (Dennis 1982, Dennis & Bramley 1985) because all these landscape elements provide "visual peaks" which have the effect of concentrating resources, in particular males for females and females for males. It has been argued that the process is particularly necessary for a butterfly like *L. megera* whose wing pattern and colouration, subject to conflicting selection pressures, is dull (Dennis 1982). The sombre colour of the butterfly (cryptic against its background habitat) is almost certainly an adaptation to predation by birds as attested by wing damage data (pers. obs.). To offset this, courtship requires strategies that increase the apparency of mates for each other.

Hilltops provide one of several medium scale landmarks that butterflies can use as mate location cues. Some species are known to use linear structures

such as gullies (*Polygonia zephyrus* and *Amblyscirtes oslari*; SCOTT 1968) and edges, particularly physical structures such as buildings and walls but also boundaries between vegetation types (*Inachis io* and *Aglais urticae*: BAKER 1972, *Vanessa atalanta, Nymphalis antiopa* and *Polygonia comma*; BITZER & SHAW 1979, 1983). Hilltopping, described in a detailed paper by SHIELDS (1967), is in some ways more unusual, inasmuch as several species of butterfly have been known to use the same feature for mate location at the same time. Hilltopping species include a heterogeneous taxonomic and behavioural assemblage, habitual patrollers as well as perchers. Males congregate on hilltops and the females visit these situations to be mated. The strategy is almost certainly used to facilitate mating and fertilisation. The sites investigated to date by SCOTT and SHIELDS have not been particularly characterised by other resources such as moisture, nectar, larval hostplants, shelter and warmth. SCOTT (1968) argues that hilltropping is a mating mechanism that aids survival in species with low density populations, although some exceptions appeared in his work which he was unable to explain. Male density is distinctly higher on hill tops in hilltopping species and an abnormally high percentage of conspecific females are virgin. Moreover, SHIELDS (1967) has demonstrated "homing in" behaviour to summits of both males and females in a series of experiments on *Papilio zelicaon*.

The present observations arise from a brief visit to the Old Fort, Corfu town, Kerkira. It became obvious during the visit that male *L. megera* were more common at the summit than at lower elevation in the fort. The Old Fort, which lies to the east of the town, rises in a series of levels (embattlements) to two towers, one (Castell Nouo) higher than the other (Castell Vechio), to a total elevation over 55 m. The population of *L. megera* is to a large extent isolated to the fort (approximately 200 × 400 m in area), surrounded as it is by sea and the town. Data on the density of *L. megera* were obtained, during a second visit on July 19, 1986, by taking counts over five minute periods at five different levels and 7 locations, from level 1 (10 metres above sea level) to level 5 (the summit). Each level was separated by at least 10 metres in elevation. Sites 1 to 5 extended up the side of Castell Nouo; site 7 is the summit of Castell Vechio and site 6 the level ground separating the two towers. The areas and habitats (levelled stone enclosures covered in scrubby patches of desiccated herbs and grasses, mainly *Deschampsia* spp.) of each site were very similar, usually affording two complete transects; however the tower of Castell Nouo had the smallest area. Care was taken to count each specimen seen only once.

More males were seen at the top of the towers than at other locations (Table 1). A minimum of 10 males were noted on the towers compared to

two at lower sites during the five other observation periods. A minimum of seven males is recorded for Castell Nouo for the five minute observation period as it was difficult to determine whether insects rising up the cliffs were the same or different individuals. Two other males were observed in transit making their way up the side of Castell Vechio. Even including these latter two individuals in the assessment as occupying lower ground, there is a significant bias by *L. megera* males for summit locations (Fisher Exact test, $p = 0.025$). It was interesting that the higher but smaller Castell Nouo had many more males than the lower but larger Castell Vechio. Five prominent territories were established on the sloping embattlement walls of Castell Nouo and other males were constantly rising up the precipitous cliffs in attempts to establish territories of their own. The only other two territorial males were found in the saddle (site 6) between the two summits on a surrounding wall. Both were heavily worn, rather weak and lacked aggression, being easily approached by an observer and each other. The only other relatively common butterfly at the fort was *Pieris rapae*. This was noted patrolling at lower sites but was absent at the two summits.

Table 1. Records of *L. megera* during five minute observation periods for 7 sites and 5 levels of elevation on the Old Fort, Corfu town, July 19, 1986 (see text for sampling details).

Site	Elevation	Males	Females
7	4	3	0 Castell Vechio
6	3	2	0
5	5	7-10	0 Castell Nouo
4	4	0	0
3	3	0	0
2	2	0	0
1	1	0	0 (1 on 16/7/86)

All but two of the males observed had either established territorial perches or were competing for them. The two individuals observed on the slopes of Castell Vechio were effectively engaged in patrolling although apparently en route for the summit. On Castell Nouo, territorial males were evenly spaced (minimum distance 3 metres ; maximum 7 metres) along a 32 metres section of the south facing sloping embattlements and the adjoining roof of a building. None were found on the north facing side. Two of the ten territorial males had established territories in shade, the remaining eight in sunshine. All were angled to the sun (facing directly away from it), those in shade with their wings open, those in bright sunshine with their wings closed, minimising the impact of direct sunlight. Male-male encounters at territorial sites involved tight spiral interactions much as those observed for the butterfly

elsewhere (DENNIS 1982) and for *Pararge aegeria* (DAVIES 1978 ; WICKMAN & WIKLUND 1983, SHREEVE 1984). No minor landscape features determined the precise location of perches for males but one male at site 6 selected the observer's white pad placed casually two metres away from its perch on the wall, its territory being distorted as a result (cf., DENNIS & WILLIAMS, in press).

At least two important questions emerge from the present observations. Why do *L. megera* males hilltop at the fort and why do they establish territories ? As it is, these observations on hilltopping and territoriality complement each other and our knowledge of *L. megera*. Several ideas have been put forward to explain hilltopping : (i) hilltops are emergence sites for females and males congregate there ; (ii) adult resources (foraging sites) occur more commonly on hilltops and males await females there ; (iii) hilltops are one of several topographic vantage points which, providing visual peaks, can be used as cues for courtship in species occurring at relatively low density. Potential emergence sites for *L. megera* occur over much of the fort area (cf., DENNIS 1983) and adult resources were no more abundant at the summits than elsewhere. Indeed, because of the small area involved both nectar and hostplants were most limited in the tower of Castell Nouo. In any case, the concentration of mate location at foraging sites could be deleterious to both sexes, as males would waste valuable energy soliciting unreceptive females, and females would be harrassed whilst egg laying (MORTON 1985, p. 223). However the butterfly was in low density at the fort (less than 20 insects seen in 1 hr within an area of 80,000 m^2) and over Corfu island generally and only one female was seen (at site 1) in two visits. These points support the third hypothesis.

Perching (wait and sit tactic), as opposed to patrolling, may also occur for several reasons (cf., DENNIS, in press) : (i) males have insufficient energy supplies to remain patrolling : more specifically, energy used in patrolling begins to exceed that used in defence (BAKER 1972) ; (ii) ambient conditions are inadequate for sustained flight which lowers body temperatures (SHREEVE 1984) ; (iii) the ratio of available females to males is substantially reduced and patrolling becomes less effective than perching at vantage points, regardless of energy resources. Although these explanations are not mutually exclusive, it is possible to separate them. Observations at the fort were carried out in the early morning when energy levels in the butterflies should be high. Moreover, other species were involved in incessant patrolling (*P. rapae* ; *I. podalirius*). In Britain, *L. megera* tends to patrol more in the warmer conditions after midday. But in Corfu shade temperatures exceeded 30°C, evidently close to optimal conditions, as thermoregulation by butterflies in the sun was geared to reducing (wings closed and body area covered) not

raising (wings open) body heat. On the other hand, females were undoubtedly in short supply and in such circumstances scrambling for a resource (females) over a wide area becomes expensive (in terms of energy expenditure) and ineffective.

It is argued then that the establishment of territorial perches and hilltopping are mechanisms intended to increase mating success by increasing the density of individuals and the probability of contacts and by minimizing energy losses. The act of territoriality does not conflict with the maintenance of high male density at hilltops, since males continually rise up to the summit to challenge incumbents (latent density greatly exceeds visible density) and females are therefore never lost for partners there. Although it would be expected that both strategies would be most effective for butterfly populations occurring at low density, there is no reason why overall density levels should necessarily contrast for hilltopping and non-hilltopping species. Butterflies differ in a number of other important respects, for instance physically (size, apparency, defence mechanisms and speed of flight), life span), behaviourally (patrol-perch spectrum) and ecologically (abundance, aggregation and coincidence of larval and adult resources; significance of nectar and moisture to adults; predictability of topographic vantage points within habitats; nature of predators), and are probably capable of making a range of adjustments to low density. Nevertheless, in the case of the sparse population of cryptically patterned *L. megera* on Corfu Old Fort, both strategies would seem to have a high premium.

References

BAKER, R. R., 1972. – Territorial behaviour of the nymphalid butterflies, *Aglais urticae* (L.) and *Inachis io* (L.). *J. Anim. Ecol.* 41 : 453-469.

BITZER, R. J. & SHAW, K. C., 1979. – Territorial behaviour of the Red Admiral. *J. Res. Lep.*, 18 : 36-49.

BITZER, R. J. & SHAW, K. C., 1983. – Territorial behaviour of *Nymphalis antiopa* and *Polygonia comma* (Nymphalidae). *J. Lep. Soc.*, 37 : 1-13.

DAVIES, N. B., 1978. – Territorial defence in the Speckled Wood butterfly (*Pararge aegeria*) : the resident always wins. *Animal Behaviour* 26 : 138-147.

DENNIS, R. L. H., 1982. – Mate location strategies in the Wall brown butterfly, *Lasiommata megera* (L.) (Lepidoptera : Satyridae) : wait or seek ? *Entomologist's Rec. J. Var.*, 94 : 209-214 ; 95 : 7-10.

DENNIS, R. L. H., 1983. – Egg-laying cues in the Wall brown butterfly, *Lasiommata megera* (L.) (Lepidoptera : Satyridae). *Entomologists's Gaz.*, 34 : 89-95.

DENNIS, R. L. H. & BRAMLEY, M. J., 1985. – The influence of man and climate on dispersion patterns within a population of adult *L. megera* (L.) (Satyridae) at Brereton Heath, Cheshire. *Nota Lepid.*, 8 : 309-324.

DENNIS, R. L. H. & WILLIAMS, W. R., 1987. – Mate location behaviour in the butterfly, *Ochlodes venata* (Br & Grey) (Hesperiidae). Flexible strategies and spatial components. *J. Lepid. Soc.*, 41 (1).

MORTON, A. C. G., 1985. – The Population Biology of an Insect with a Restricted Distribution : *Cupido minimus* Fuessly (lep., Lycaenidae). *Ph.D. Thesis, Southampton.*

SCOTT, J. A., 1968. – Hilltopping as a mating mechanism to aid the survival of a low density species. *J. Res. Lep.*, 7 : 191-204.

SHIELDS, O., 1967. – Hilltopping. *J. Res. Lep.*, 6 : 69-178.

SHREEVE, T. G., 1984. – Habitat selection, mate location and microclimate constraints on the activity of the Speckled wood butterfly, *Pararge aegeria. Oikos* 42 : 371-377.

WICKMAN, P. O. & WIKLUND, C., 1983. – Territorial defence and its seasonal decline in the Speckled wood butterfly (*Pararge aegeria*). *Animal Behaviour* 31 : 1206-1216.

Book reviews – Buchbesprechungen – Analyses

E. PALM : Nordeuropas Pyralider. 18 × 25 cm, 287 pp., 8 colour plates, 264 figs and ca. 400 distribution maps, Apollo Books, Lundbyvej 36, DK-5700 Svendborg, Denmark, 1986, DKr. 400,- (ISBN 87-88738-04-3).

This book is the third volume in the series "Danmarks Dyreliv" (Vol. 1 : Diptera, Syrphidae and Vol. 2 : Lepidoptera, Geometridae) of which many volumes are in preparation. The author gives the characteristics of the family Pyralidae and then treats all of the North European Pyralidae species in the same way : description of the adult, distribution in northern Europe, habitat, phenology, flight period, food plant and larval behaviour. There are two distribution maps for almost all species : one of North Europe and one of Denmark. The identification of sibling species is facilitated with drawings of genitalia or wing venation. The colour plates depict all of the treated species. The Phycitinae are somewhat enlarged and the other subfamilies slightly reduced. This does not hamper the identification of specimens, except maybe for the Scopariinae.

Unfortunately, the main body of the book is written in Danish and this could prevent a wide distribution of this interesting study. To solve this problem partly, a very short summary in English is given for each species. The book is of interest for all entomologists studying Pyralidae. Subscribers to the whole series profit from a discount of 15% on all volume prices.

W. O. De Prins

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Emmelina jezonica pseudojezonica ssp. nov. (Lepidoptera, Pterophoridae)

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Summary

Emmelina jezonica (MATSUMURA, 1931) was recorded as new to Germany and Europe by DERRA (1980). All known European specimens and some from Japan have now been seen by the author. A comparison of the two populations has shown that there are constant differences in the male genitalia, although none could be found in the female or in external appearance. The differences are considered to be of subspecific importance only. The European subspecies is described under the name *Emmelina jezonica pseudojezonica* ssp. nov. It has so far been recorded from Germany, Austria, France, Italy, Hungary and Switzerland, and it appears to be restricted to wet habitats.

Emmelina jezonica (MATSUMURA, 1931), wurde 1980 als neue Pterophoridae für Deutschland bekannt gemacht (DERRA 1980). Die weitere Forschung und der Vergleich mit Exemplaren von *jezonica* aus Japan zeigte, daß die europäischen Tiere, die für diese Art gehalten wurden, eine distinkte Unterart darstellen. Die europäischen Tiere werden als *Emmelina jezonica pseudojezonica* ssp. nov. beschrieben.

Emmelina jezonica pseudojezonica ssp. nov.

Holotypus ♂:

Germania BRD, Tongruben bei Bensheim, Hessen, 3.10.1983, leg. M. KRISTAL, in coll. DERRA, Gen. Präp. Nr. 2045 DERRA.

Paratypen :

Austria : 1 ♂, Burgenland, Zitzmannsdorfer – Wiesen, 18.7.1964, leg. GLASER, in coll. ARENBERGER, Gen. Präp. Nr. 4604 JÄCKH.

Gallia : 1 ♂, Oraison, Haute Provence, 17.6.1966, leg. PFISTER, in coll. PRÖSE, Gen. Präp. Nr. 80/320 PRÖSE.

Germania BRD : 1 ♀, Gernsheim, Hessen, 26.9.1972, leg. DERRA et in coll., Gen. Präp. Nr. 1349 DERRA. 1 ♂, Brühl bei Heidelberg, 5.9.1975, leg. BLÄSIUS et in coll., Gen. Präp. Nr. 937 DERRA. 1 ♀, Ketsch bei Heidelberg,

1.4.1976, leg. BLÄSIUS et in coll., Gen. Präp. Nr. 1208 DERRA. 1 ♂, 2 ♀♀, Hockenheim, 1.10.1976, leg. DERRA et in coll., Gen. Präp. Nr. 827 ♂, 846, 858 ♀♀ DERRA. 1 ♂, Hockenheim, 7.10.1978, leg. BLÄSIUS, in coll. DERRA, Gen. Präp. Nr. 1280 DERRA. 1 ♂, Brühl bei Heidelberg, 21.8.1979, leg. BLÄSIUS, in coll. DERRA, Gen. Präp. Nr. 1205 DERRA. 3 ♂♂, 3 ♀♀, Daten wie bei Holotypus, leg. KRISTAL et in coll., Gen. Präp. Nr. 2074, 2075, 2077 ♂♂, 2072, 2073, 2079 ♀♀ DERRA. 3 ♂♂, 2 ♀♀, Daten wie bei Holotypus, leg. KRISTAL, in coll. DERRA, Gen. Präp. Nr. 2044, 2046, 2047 ♂♂, 2042, 2043 ♀♀ DERRA. 1 ♂, Achkarren, Kaiserstuhl, 15.6.1957, leg. E. DE BROS et in coll., Gen. Präp. Nr. E-179 WHITEBREAD.

Italia: 4 ♂♂, Lazio Fregene, 7.8.1981, Gen. Präp. Nr. 2393, 2518, 2522, 2523 DERRA. 3 ♀♀, Lazio Fregene, 3.7.1981, Gen. Präp. Nr. 2392, 2521, 2524 DERRA. 1 ♀, Focene, 26.6.1982. 1 ♂, 2 ♀♀, Focene, 30.6.1981. 1 ♂, Focene, 22.6.1982, Gen. Präp. Nr. 2394, 2396 ♂♂, 2395, 2519, 2520 ♀♀ DERRA, leg. PROLA et in coll.

Hungaria: 1 ♂, Bogiarelle berek szele, 14.8.1979, leg. Dr. GOZMANY, Gen. Präp. Nr. 2603 DERRA. 1 ♂, Gyon Kertesz, Gen. Präp. Nr. 2613 DERRA. 1 ♀, Kiskuser Fülöpnaza, Kutatonaz, 13.7.1977, leg. Dr. GOZMANY, Gen. Präp. Nr. 2625 DERRA. 1 ♀, Kiskusag Orgavany, Deak-tanya, 5.8.1980, leg. RONKAY, Gen. Präp. Nr. 2626 DERRA. 1 ♂, Kiskusag, Bugac mocsar, 22.8.1979, leg. Dr. GOZMANY, Gen. Präp. Nr. 2637 DERRA. 1 ♀, Batorliget, Vedett lep., 23.6.1949, leg. KASZAB, Gen. Präp. Nr. 2541 DERRA. 1 ♀, Batorliget, leg. EHIK und BUNDAY, Gen. Präp. Nr. 2644 DERRA. 1 ♂, 1 ♀, Dömsöd Aranouszta, 14.6.1980, leg. Dr. GOZMANY, Gen. Präp. Nr. 2639 ♂, 2635 ♀ DERRA. Alle Tiere in coll. Natur-Historisches Museum in Budapest.

Helvetia: 1 ♂, La Souste, Valais, Camping Bella Tolla, 25.5.1979, leg. N. VON ROTEN, Gen. Präp. Nr. E-190 WHITEBREAD.

DIAGNOSE

Expansion 19-25 mm. Vorderflügel hellbraun, ockerfarbig, unregelmäßig mit dunklen Schuppen durchsetzt. Die vordere Hälfte des Vorderflügel mit grauen Schuppen übergossen. Fransen etwas dunkler als die Flügelfärbung. Vor der Spalte ein dunkler länglicher Fleck. Ein kleiner dunkler Punkt etwa 1/4 vor der Wurzel in der Mitte der vorderen Flügelhälfte. Ein etwas größerer dunkler Fleck am Hinterrand etwa 1/5 vor der Wurzel. Hinterflügel dunkel graubraun leicht glänzend, Fransen von gleicher Färbung. Vorderflügelunterseite braun, dunkler als die Oberseite. Hinterflügelunterseite von gleicher Farbe wie die Oberseite.

Männlicher Genitalapparat (Abb. 3-5):

Genitalapparat unsymmetrisch. Linke Valve etwas breiter als die rechte. Rechte Valve distal zweilappig. Ein schwach sklerotisierter Zapfen überragt

das zweilappige Valvenende. Dieser Zapfen ist nur halb so lang wie bei der Nominat–Unterart. Am Ende des Sacculus liegt eine Chitinleiste längs des Valvenrandes, von etwa 1/3 der Valvenlänge. Bei der Nominat–Unterart ist diese Chitinleiste erheblich kürzer. Linke Valve mit einen bauchigen, S-förmigen Clasper, der frei beweglich ist und dadurch bei der Präparation in den verschiedensten Lagen zu liegen kommen kann. Ein breiter, stark behaarter Fortsatz liegt oberhalb des S-förmigen Clasper auf der Valve. Dieser Fortsatz ist proximal etwa 2/3 so breit wie die Valve, verjüngt sich distal sehr stark zu einen abgerundeten Zapfen, der das Valvenende überragt. Die Costa des aufliegenden Fortsatzes geht an der Basis des Zapfens etwa

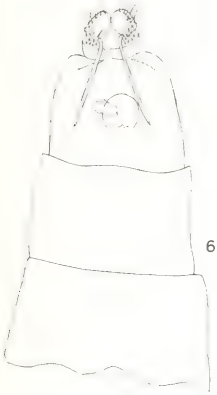
Abb. 1. Erste Reihe, *Emmelina jezonica jezonica* (MATSUMURA).
links, Japan, Teine, Hokkaido, 23.9.1959, leg. T. KUMATA, in coll. DERRA.
mitte, Japan, Sapporo, Hokkaido, 7.9.1974, leg. T. KUMATA, in coll. DERRA.
rechts, Japan, Sapporo, Hokkaido, 31.10.1963, leg. T. KUMATA, in coll. DERRA.
Zweite Reihe, *Emmelina jezonica pseudojezonica* ssp. nov.
links, Germania BRD, Hessen, 3.10.1983 (Holotypus).
mitte, Germania BRD, Hessen, 3.10.1983 (Paratypus).
rechts, Germania BRD, Hockenheim, 1.10.1976 (Paratypus).
Dritte Reihe, *Emmelina monodactyla* (LINNAEUS).
links, Spanien, Lorca 700 m, 8.7.1980, leg. DERRA et in coll.
mitte, Aegypten, Fayum oasis, 3.3.1977, leg. ZOUHAR, in coll. DERRA.
rechts, Germania BRD, Umg. Bamberg, Bug, 11.7.1978, leg. DERRA et in coll.

rechtwinklig nach innen, geht dann winklig in den Zapfen über. Dieser Fortsatz ist bei der Nominat-Unterart proximal nur 1/2 so breit wie bei *pseudojezonica* und die Costa geht distal durch eine Wölbung in den Zapfen über. Anellusarme gleich lang und doppelt so breit wie bei der Nominat-Unterart. Aedeagus gerade, distal leicht verjüngt, bei der Nominat-Unterart gebogen. Uncus leicht gebogen, bei der Nominat-Unterart sehr stark sichelförmig gebogen.

Abb. 2. *Emmelina jezonica jezonica* (MATS.) ♂, Gen. Präp. nr. 2049 DERRA.
Abb. 3-5. *Emmelina jezonica pseudojezonica* ssp. nov., ♂ Genitalapparat.
3. Holotypus ; 4. Paratypus, Gen. Präp. Nr. 2046 ; 5. Paratypus, Gen. Präp. nr. 2394.

Weiblicher Genitalapparat (Abb. 7, 8):

Das Ostium ist stark zerfranst und sehr dünnhäutig. Bei ventraler Präparation wird es durch die Lamella antevaginalis meist verdeckt. Die Lamella antevaginalis, eine Ausstülpung des achten Sternites, erscheint ventral als kugeliges Gebilde, bei Lateralansicht zeigt sie sich als abstehender abgerundeter Zapfen. An der weiblichen Genitalarmatur konnte im Vergleich zur Nominat-Unterart kein Unterschied festgestellt werden.



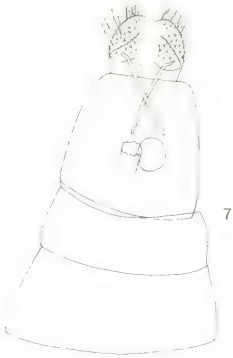


Abb. 6. *Emmelina jezonica jezonica* (MATSUMURA) ♀, Genitalapparat, Gen. Präp. Nr. 2051. Ventralansicht.
Abb. 7. *Emmelina jezonica pseudojezonica* ssp. nov. Paratypus ♀, Gen. Präp. Nr. 2043 DERRA, Ventralansicht.

DISKUSSION

Emmelina jezonica pseudojezonica ssp. nov. ist im Vergleich zu *E. jezonica jezonica*, im männlichen Genital erheblich unterschieden. Am weiblichen Genital konnten keine Unterschiede festgestellt werden. Trotz der Unterschiede am männlichen Genital wird *pseudojezonica* als Unterart behandelt. Ob *pseudojezonica* eine Unterart von *jezonica* ist, oder vielleicht doch Artrang besitzt, kann erst geklärt werden, wenn über die Verbreitung und morphologische Variabilität beider Taxa mehr bekannt ist. Es ist Material aus allen Verbreitungsgebieten erforderlich, um zu klären, wieweit die Unterschiede konstant sind und wo Übergänge vorhanden sind.

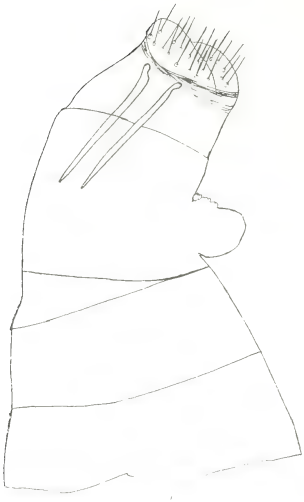


Abb. 8. *Emmelina jezonica pseudojezonica* ssp. nov. Paratypus ♀, Gen. Präp. Nr. 2079 DERRA, Lateralansicht.

Emmelina jezonica pseudojezonica ssp. nov. ist bekannt aus folgenden Ländern Europas: Deutschland, Österreich, Frankreich, Schweiz, Italien und Ungarn. Alle zur Zeit bekannten europäischen Tiere der hier behandelten Art haben mir vorgelegen und wurden von mir untersucht. Genitaliter ist bei den europäischen Tieren keinerlei Variabilität festzustellen. Inwieweit die Nominat-Unterart aus Japan in ihren Merkmalen konstant ist, konnte an dem wenigen mir zur Verfügung stehenden Material nicht geklärt werden. Bei PROLA und RACHELI 1984, wird *jezonica* auch aus Polen angegeben, diese Angabe muß revidiert werden. BUSZKO (Torum, Polen) teilte mir mit, daß diese Art aus Polen nicht bekannt ist. Die weiteren Funde außerhalb Europas sind: Georgien USSR, Batumi an der Ostküste das Schwarzen Meeres, (Briefliche Mitteilung von BUSZKO, Torum, Polen); NW Pakistan, Prov. Swat. Mandschurei, Yablonya, Hsiaoling, Djalantun. Die außereuropäischen Tiere konnte ich nicht untersuchen, somit auch keine Aussage darüber machen.

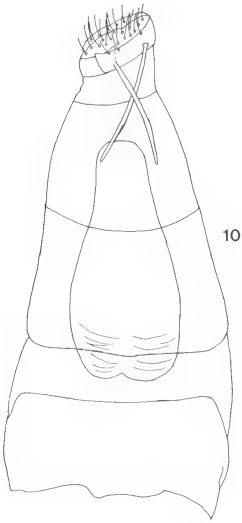
Abb. 9. *Emmelina monodactyla* (LINNAEUS), Genitalapparat ♂, Germania BRD, Hessen, Bensheim, 5.10.1983, leg. KRISTAL et in coll., Gen. Präp. Nr. 2076 DERRA.

Die Bionomie ist unbekannt.

Meine früher geäußerte Meinung (DERRA 1980), daß *jezonica* MATS. (ssp. *pseudojezonica*) keines bestimmten Lebensraumes bedarf, muß revidiert werden. Es ist nach heutigen Kenntnissen mit großer Wahrscheinlichkeit anzunehmen, daß ssp. *pseudojezonica* nur Feuchtgebiete besiedelt.

Neben der hier beschriebenen Unterart wird auch die Nominat-Unterart (Abb. 1, 2, 6) und *Emmelina monodactyla* (LINNAEUS, 1758) (Abb. 1, 9, 10, 11) als Imago, sowie genitaliter in beiden Geschlechtern abgebildet.

Meinen besonderen Dank möchte ich an dieser Stelle den Herren Dr. KUMATA (Sapporo, Japan) und Dr. YANO (Yamaguchi, Japan) für die Beschaffung von Material der *Emmelina jezonica* MATS aussprechen. Meinen Dank auch den Herren, die mir europäisches Material zur Verfügung stellten : Dr. GOZMANY (Budapest, Ungarn), M. KRISTAL (Bürstadt, BRD), S. E. WHITEBREAD (Magden, Schweiz), C. PROLA (Rom, Italien), sowie Dr. BUSZKO (Torum, Polen) für briefliche Mitteilung.



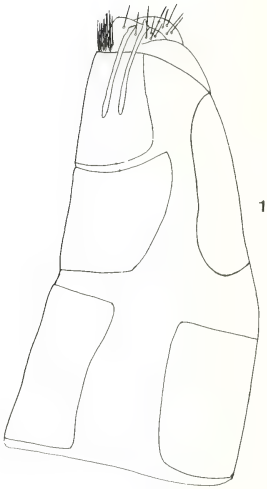


Abb. 10. *Emmelina monodactyla* (LINNAEUS) ♀, Genitalapparat, Gen. Präp. Nr. 2048 DERRA. Ventralansicht.
Abb. 11. *Emmelina monodactyla* (LINNAEUS) ♀, Genitalapparat, Gen. Präp. Nr. 2078 DERRA. Lateralansicht.

Literatur

BUSZKO, J., 1977. – Manchurian Pterophoridae : *Polski Pismo Entomologiczne* 44 : 333-337.

DERRA, G., 1980. – Eine für Deutschland neue Pterophoridae : *Atalanta* 11 (3) : 205-211.

HANNEMANN, H. J., 1977. – Die Tierwelt Deutschlands 63. Teil. Pterophoridae, Yponomeutidae, Tineidae. Fischer Verlag, Jena.

PROLA, C. u. RACHELI, T., 1984. – An annotated list of Italian Pterophoridae : *Atalanta* 15 (3/4) : 305-337.

WAGNER, H., 1913. – Lepidopterorum Catalogus, Meyrick E., Pterophoridae, Orneodidae : 17 : 3-44.

YANO, K., 1963. – Pterophoridae of Japan : *Pacific Insects* 5 : 188-193, fig. 86a-c, 87-89.

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Scrobipalpa (Euscrobipalpa) dagmaris sp. n. und andere interessante Entdeckungen bei den europäischen Gnorimoschemini (Lepidoptera, Gelechiidae)

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In einigen Veröffentlichungen der letzten Jahre habe ich wiederholt auf wichtige Erkenntnisse im Rahmen der gelechioiden Tribus Gnorimoschemini aufmerksam gemacht, die sich aus einer kontinuierlichen Erforschung dieser taxonomisch schwierigen Gruppe ergaben (siehe z. B. Povolný, 1982, 1983, 1984a, b). Dies zusammen mit den Namenlisten von Lepidopterenarten, die in verschiedenen Ländern Europas veröffentlicht wurden, stimulierte weitere Materialsendungen. Zusammen mit eigenen Erkenntnissen resultieren diese in weiteren Neuentdeckungen, bzw. in faunistisch und biogeographisch wichtigen Schlussfolgerungen. Man muss voraussetzen, dass noch längere Zeit sowohl formelle als auch inhaltliche Veränderungen notwendig sein werden, da verschiedene Taxa der Gnorimoschemini nicht nur im Rahmen der ehemaligen Sammelgattungen, wie etwa „*Lita* auct." oder „*Gelechia* auct.", sondern auch in anderen ähnlich aufgefassten Gattungen (z. B. *Bryotropha, Aristotelia, Xystophora* usw.) auftauchen werden. Der schöpferische Forschungsprozess sollte durch diesen Tatbestand nicht gehindert werden.

Wegen der Aktualität solcher Entdeckungen mache ich auf sie aufmerksam, noch bevor die Monographie der Tribus Gnorimoschemini im Rahmen der „Microlepidoptera palaearctica", welche jetzt intensiv vorbereitet wird, zur Verfügung steht. Bei dieser Gelegenheit möchte ich all jenen, die dabei beteiligt waren, meinen verbindlichen Dank aussprechen, so vor allem : Frederico Hartig, Rom ; Dr. Hugo van der Wolf, Nuenen ; Dr. C. Gielis, Nuenen ; Dr. Antonio Vives Moreno, Madrid ; Dr. František Gregor, Brno ; Dr. Josef Klimesch, Linz ; Prof. Dr. R. U. Roesler, Karlsruhe.

Unlängst wurde in der östlichen Slowakei eine bisher unbekannte *Scrobipalpa*-Art entdeckt (Povolný, 1984b), die ich als *Scrobipalpa reiprichi* Povolný beschrieb. Inzwischen wurde diese Art auch in Norwegen gesammelt (Karsholt et al. 1986). Somit wiederholte sich praktisch die Geschichte von *Scrobipalpa clintoni* Povolný, 1968, die nach ihrer Entdeckung

und Beschreibung (aus Schottland) in mehreren skandinavischen Ländern und zuletzt auch in Nordrussland nachgewiesen, und auf diese Weise ihr von manchen wiederholt angezweifelter taxonomischer Wert bestätigt werden konnte. Die beiden Arten dürften verwandt sein. So bewahrheitete sich die Vermutung, dass taxonomische Neuentdeckungen im Rahmen dieser Tribus in Europa nicht nur auf das Mediterraneum beschränkt sein dürften. Diese Feststellung wurde jetzt erneut bestätigt, nachdem im Nachlass von F. HARTIG eine weitere, offenbar unbekannte *Scrobipalpa*-Art entdeckt werden konnte, die am Ufer des norditalienischen Sees Lago di Garda in der Umgebung von Gargano gesammelt wurde. Auch in diesem Falle dürfte es sich um eine mit *Scrobipalpa clintoni* POVOLNÝ und *S. reiprichi* POVOLNÝ verwandte Art handeln, die eher den Kalkbiotopen der Alpen als den Eremialbiotopen des europäischen Südens zugehörig sein dürfte.

Der von manchen geforderten kladistischen Begründung der genauen Verwandtschaft von bisher unbeschriebenen *Scrobipalpa*-Arten stellen sich kaum überwindbare Hindernisse in den Weg, weil sich diese Gattung offenbar in der Phase einer adaptiven Radiation in der Palaearktis befindet und die Entscheidungen über synapomorphe und plesiomorphe Merkmale rein subjektiv sein müssten, abgesehen von anderen objektiven Umständen, die an dieser Stelle nicht ausgeführt werden können. Sollte man solchen Forderungen entsprechen, so hiesse es, bei dem Grossteil dieser Arten Differentialdiagnosen zu allen restlichen Arten der Gattung auszuarbeiten, was an sich absurd wäre, abgesehen von dem Umstand, dass an der objektiven Existenz von fast 300 Arten dieser Gattung nicht im geringsten gezweifelt werden kann.

Scrobipalpa dagmaris sp. n.

Diagnose

Eine mittelgrosse, relativ schmalflügelige Art bräunlicher Grundfärbung mit einer deutlichen schwärzlichen Vorderflügelzeichnung. Der einzige Falter ist sehr gut erhalten. Vorderflügellänge 6 mm.

Holotypus : ♂, Italia, L. d. Garda, Gargano, 4.8.1974, HEISS. Das Exemplar befindet sich in meiner Sammlung, die im Besitz der Landessammlungen für Naturkunde, Karlsruhe, ist.

Kopf, Thorax und Tegula bedeckt von ockerfarbenen Schuppen mit verdunkelter Spitze und mit leichtem bräunlichem Stich. Stirn glänzend weisslich aufgehellt. Labialpalpus deutlich säbelartig gebogen. Zweites Palpusglied mit abstehenden Schuppen, ockerweisslich mit Andeutung eines breiten basalen und eines subterminalen Ringes auf der Aussenseite. Drittes Glied mit zwei deutlichen, breiten, schwärzlichen Ringen. Palpusinnenseite aufgehellt.

Grundfärbung des Vorderflügels ockerbräunlich mit schwarzen, bräunlich umrandeten Stigmen. Costalrand, Apex und Tornus mit z. T. dichten schwärzlichen Schuppen. Dorsalrand nur im Basaldrittel schmal schwärzlich verdunkelt. Von den drei bereits erwähnten stigmenartigen schwärzlichen Punkten ist der erste, der etwa im ersten Drittel der Flügelmitte liegt, ziemlich gross, aber unregelmässig und konturarm. Der zweite und der dritte Punkt liegen weiter axial, sind kleiner, leicht oval vorgezogen und z. T. bräunlich umrandet. Akzessorische schwarze Punkte befinden sich am Costalrand nahe der Flügelbasis, und etwa im ersten Drittel der Costallänge. Die Grenzen zwischen bräunlichen und schwärzlichen Schuppenfeldern sind unscharf, die äussere Querbinde ist nicht entwickelt, bzw. sie schmilzt mit dem bräunlichen Flügelfeld zusammen. Fransen grau (Abb. 1). Hinterflügel schmutzig weisslich mit grauen Rändern. Fransen hellgrau. Beine hellgrau, ziemlich deutlich und breit schwärzlich geringelt.

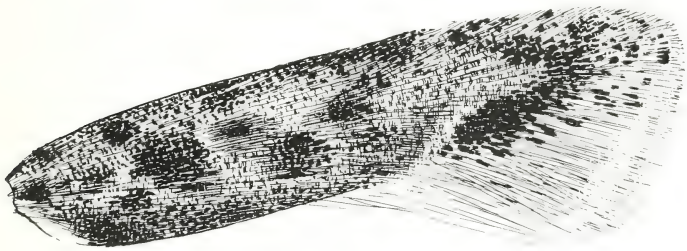

Abb. 1. *Scrobipalpa (Euscrobipalpa) dagmaris* sp. n. Vorderflügelzeichnung des männlichen Holotypus.

Genitalien

Verhältnismässig (zu der Imagogrösse) subtil gebaut mit relativ kurzen, nur mässig verdickten Valven, stumpf abgestutztem, schmalem Uncus und deutlich vorgezogenem Saccus. Medialausschnitt tief und breit; Aedeagus kurz und sehr plump wirkend. Uncus verhältnismässig schmal, oben mässig konkav ausgeschnitten. Der paarige Fortsatz beiderseits dieses Ausschnittes ist ziemlich schlank, mässig nach innen gebogen, unscharf. Parabasaler Valvenfortsatz deutlich breiter, aber kaum wesentlich länger, mit gerundeter Aussenkante und einer kurz nach innen auslaufenden Spitze. Valva schmal, am Ende mässig keulenförmig verdickt, fein behaart, kaum über die obere Uncuskante ragend. Saccus relativ gross, lang gezogen und mässig zuge-

spitzt. Aedeagus etwa 2/3 der Genitallänge entsprechend, ziemlich dick und plump wirkend, sein Caecum nur mässig kürzer als Aedeaguskörper. Spitze stumpf mit einer deutlichen subterminalen, leicht gebogenen Leiste (Abb. 2).

Bemerkungen

Die Art wirkt sowohl habituell als auch genitaliter besonders im Rahmen der europäischen Gnorimoschemini recht auffallend. Das Fehlen des Weibchens erschwert das an sich im Rahmen dieser Gattung schwierige Problem der Artverwandschafts zuordnung (siehe auch oben). Allerdings dürfte die Art in bezug auf den tiefen Medialausschnitt der Sacculusfalte und die Form und Grösse der paarigen Fortsätze mit der *Scrobipalpa clintoni-S. reiprichi*-Gruppe verwandt sein. Nähere Umstände des Fundes dieses fast unversehrten Männchens sind unbekannt.

Scrobipalpa vasconiella (RÖSSLER, 1877) comb. n.

RÖSSLER, 1877, Ent. Ztg. Stett., 38 : 377 (Lita).
Syn. : *Scrobipalpa drahomirae* POVOLNÝ, 1966 (Acta ent. bohemoslov., 63 : 400), syn. n.

Das Typenmaterial blieb jahrelang unauffindbar ; meine Anfragen bei Dr. R. AGENJO, Madrid, und Dr. K. SATTLER, London, waren erfolglos (siehe POVOLNÝ 1977, S. 196). Jetzt verdanke ich Herrn Dr. Antonio VIVES MORENO, Madrid, die Zusendung der beiden Syntypen ; ein Männchen und ein Weibchen. Die Genitalien wurden bereits von Dr. SATTLER präpariert, siehe dazu die Abb. 3, 4. Abb. 5 zeigt die in natürlicher Lage gezeichneten männlichen Genitalien. Die scheinbaren Unterschiede zwischen der Abb. 5 und denjenigen des männlichen Syntypus sind auf unterschiedliche Einbettungsmethoden zurückzuführen.

Die Verbreitung von *Scrobipalpa vasconiella* (RÖSSLER) erstreckt sich, wie ich in zahlreichen Veröffentlichungen nachweisen konnte, von den Kanarischen Inseln und Madeira über das ganze europäische und nordafrikanische Mediterraneum (Südspanien, Südfrankreich, Sardinien, Süditalien, Südgriechenland, Mauretanien, Algerien, Cyrenaike, Türkei, Südrussland) bis Iran und Afghanistan. Die Art dürfte dabei zumindest teilweise halophil sein.

Scrobipalpa superstes POVOLNÝ, 1977

POVOLNÝ, 1977, Acta ent. bohemoslov., 74 : 189-192.

Diese interessante Art wurde nach mehreren Faltern aus Südspanien (Trebujena am Quadalquivir, Mazagón bei Huelva, Las Palmeras bei Garrucha, Chiclana) beschrieben, die vorwiegend in den achtziger Jahren dort gesam-

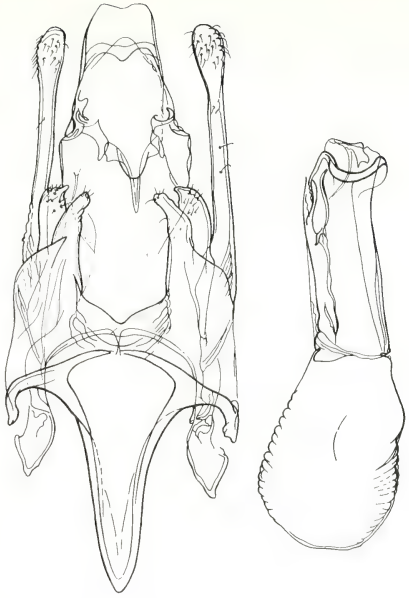

Abb. 2. *Scrobipalpa (Euscrobipalpa) dagmaris* sp. n. Männliche Genitalien des Holotypus.

Abb. 3. *Scrobipalpa (Euscrobipalpa) vasconiella* (RÖSSLER, 1877) comb. n., bezettelt „*Lita vasconiella* RÖSSLER, Bilbao, 22.V., Seebold, Lectotype, K. SATTLER 622 d, Mercurochrom, Euparal, Lectotype". Eine Federskizze (POVOLNÝ del.).

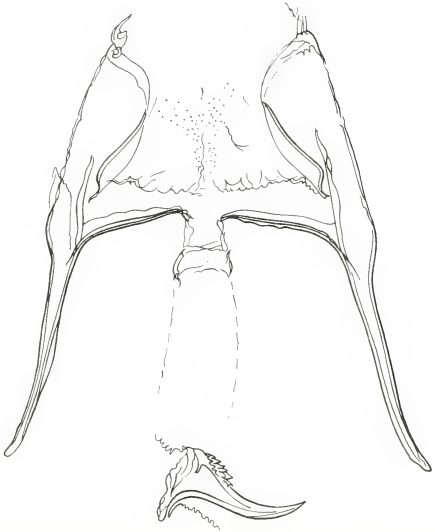

Abb. 4. *Scrobipalpa (Euscrobipalpa) vasconiella* (RÖSSLER, 1877) comb. n., bezettelt „*Lita vasconiella* RÖSSLER, Bilbao, Seebold, Paralectotype, K. SATTLER, 623 a, Mercurochrom, Euparal, Paralectotype". Eine Federskizze (POVOLNÝ del.).

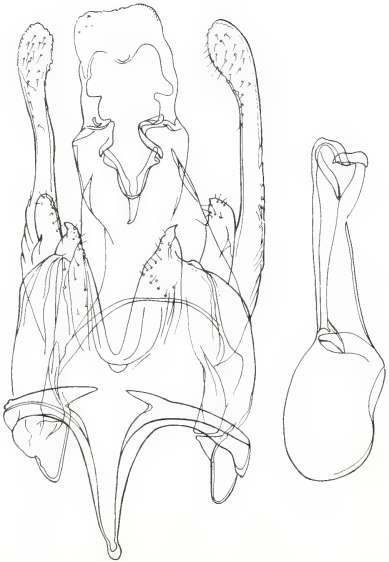

Abb. 5. *Scrobipalpa (Euscrobipalpa) vasconiella* (RÖSSLER, 1877) comb. n., Präp. Am. 3638, Hispania Port Bou, 18.6.1963, W. u. M. GLASER. Eine Federskizze der männlichen Genitalien in Kanadabalsam in natürlicher Lage, ohne Druck auf Deckgläschen, durch den Missbildungen entstehen (siehe Abb. 3, 4).

melt wurden, obwohl mir mangelhaft bezeichnete Falter vom Ende des vorigen Jahrhunderts bekannt waren (POVOLNÝ, 1977). Dr. H. V. D. WOLF schickte mir ein weiteres Männchen dieser Art, das von Dr. GIELIS in Porto Santa Maria bei Cadiz (13.5.1979) gesammelt wurde. Verglichen mit den Spätsommerfaltern der Originalserie wirkt dieses Männchen etwas stattlicher, hat aber sonst dieselbe blass graue Vorderflügelgrundfärbung mit ockerfarbener Tönung und mit undeutlichen schwarzen Punkten. Das Fangdatum bezeugt, dass diese Art zumindest bivoltin sein muss (die meisten *Scrobipalpa*-Arten sind polyvoltin). *Scrobipalpa superstes* scheint nur in den sandigen und salinen Biotopen Südwestspaniens zwischen Huelva und Cadiz der atlantischen Küste vorzukommen.

Scrobipalpa ustulatella (STAUDINGER, 1870)

STAUDINGER, 1870, Berl. Ent. Ztschr., 14 : 307.
POVOLNÝ, 1982, Nota lepid., 5 : 130-131.

Ich habe erst unlängst auf den Umstand aufmerksam gemacht, dass diese Art seit ihrer Beschreibung (und Entdeckung beim ehemaligen Sarepta in Südrussland) nie mehr gesammelt wurde, so dass nur zwei Syntypen bekannt blieben. Desto grösser war die angenehme Überraschung, als Dr. GIELIS zwei gut erhaltene und einwandfreie Männchen von *Scrobipalpa ustulatella* (STAUDINGER), dieser so wichtigen Art, sammeln konnte (Murcia, 20.4.1978 und Granada, 22.4.1978). Auf diese Weise konnte die Existenz dieser interessanten Art nach mehr als hundert Jahren bestätigt werden. Dieser Befund dürfte bezeugen, dass es sich um eine mediterrane, auf aride Biotopen gebundene Art handelt, die in diesem Raum mehr verbreitet sein dürfte, als wir heute wissen.

Scrobipalpa instabilella stabilis POVOLNÝ, 1977

POVOLNÝ, 1977, Acta ent. bohemoslov., 74 : 192-194.

Diese ziemlich auffallende, gross und plump wirkende Form wurde aus der Umgebung von Baza (Granada) beschrieben. Ein weiteres, beträchtlich grosses und eintönig schwärzliches Männchen mit charakteristischen Genitalien stammt aus dem Rosas-Gebiet (Gerons, 16.5.1980, leg. GIELIS).

Ochrodia subdiminutella (STAINTON, 1867)

STAINTON, 1867, Tin. Syria and Asia Min., 45.
POVOLNÝ, 1981, Acta Univ. agric. (Brno), 29 : 382-384.

Dies ist erst der zweite einwandfreie Nachweis des Vorkommens dieser panpalaeotropisch-subtropisch verbreiteten Art in Europa. Das erste bekannte Männchen aus Europa wurde von F. HARTIG auf dem Hang des Monte

Vulture (Basilicata) in Zentral-Italien gesammelt (POVOLNÝ, 1981). Das erste Stück aus Spanien ist ein Männchen der dunklen Form dieser Art, das am 23.5.1971 bei La Murta (Murcia) von Dr. GIELIS erbeutet wurde. Dieser Befund bestätigt, dass diese sonst in Afrika, Arabien, dem Nahen und Mittleren Osten bis Pakistan und Indien und in Australien in den riesigen ariden Räumen weit verbreitete und lokal sehr häufige Art, auch im europäischen Mediterraneum wahrscheinlich selten vorkommt. Somit ist diese Art gemeinsam mit *Scrobipalpa ustulatella* (STAUDINGER) neu für Spanien.

In dem von Dr. GIELIS in Südspanien gesammelten Material sind noch *Scrobipalpa salinella* (ZELL.), *S. obsoletella* (F. v. R.) und *Phthorimaea operculella* (ZELL.) meist häufig vertreten, deren Vorkommen und Verbreitung in Spanien bereits von POVOLNÝ (1977) charakterisiert wurden.

Schrifttum

KARSHOLT, O. et al., 1986. — A remarkable disjunktion : *Scrobipalpa reiprichi* POVOLNÝ, 1984 discovered in Norway, with remarks on the characteristic of the species (Lepidoptera, Gelechiidae). *Nota lepid.*, 9 : 191-199.

POVOLNÝ, D., 1977. — Zur Fauna der Tribus Gnorimoschemini (Lepidoptera, Gelechiidae) der Iberischen Halbinsel. *Acta ent. bohemoslov.*, 74 : 184-204.

POVOLNÝ, D., 1981. — Über neue und wenig bekannte Arten der Tribus Gnorimoschemini (Lep., Gelechiidae) aus dem Mediterraneum. *Acta Univ. agric.* (Brno), 29 : 365-397.

POVOLNÝ, D., 1982. — Zur artspezifischen Identität mancher westpaläarktischer Gnorimoschemini (Gelechiidae). *Nota lepid.*, 5 : 121-132.

POVOLNÝ, D. & LUQUET, G., Chr., 1983. Commentaires sur quelques Gnorimoschemini nouveaux ou peu connus de France. *Alexanor*, 13 : 63-74.

POVOLNÝ, D., 1984a. — Drei neue Arten der Tribus Gnorimoschemini (Lepidoptera, Gelechiidae) aus Asien. *Nota lepid.*, 7 : 264-270.

POVOLNÝ, D., 1984b. — *Scrobipalpa (Euscrobipalpa) reiprichi* sp. n. (Lepidoptera, Gelechiidae) a surprising discovery from Eastern Slovakia. *Acta ent. bohemoslov.*, 81 : 453-457.

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A New Palaearctic Archipini genus (Lepidoptera, Tortricidae)

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The new genus described below belongs in the Archipini (Tortricinae) which are characterised by the following probable autapomorphies : the completely atrophied costa of the valva, the presence of the densely plicate internal surface of the valva (the disc), the presence of a basal sclerite of the disc which is usually well developed and fused with the base of the transtilla, and a funnel like sclerite extending from the base of the transtilla to the basal sclerite of the outer surface of the valva.

Tosirips gen. n.

Type-species : *Tortrix perpulchrana* Kennel, 1901.

External appearance and venation as in *Ptycholomoides* Obraztsov ; costal fold of male forewing absent.

Male genitalia : Uncus broad, haired ventrally ; gnathos with strong arm and simple terminal plate ; socius a long, membranous, sparsely hairy lobe ; vinculum typical of the group ; valva distinctly tapering terminally, with long longitudinal plicate fold extending from beneath transtilla where a weak pulvinus develops to beyond sacculus, accompanied by dorsal plication ; sacculus broad, expanded in middle ventrally, terminal end not free ; transtilla folded longitudinally, slender medially, strongly expanded and cup-shaped laterally ; juxta simple ; aedeagus with large coecum penis and caulis ; cornuti deciduous.

Female genitalia : Sterigma represented by lateral plates tapering terminally and concave medially, fused with slightly asymmetrical colliculum provided with sclerites ; ductus seminalis rising from anterior part of colliculum, dorsally ; signum absent.

Early stages undescribed. Bionomy : probably univoltine ; foodplant : *Quercus* spp.

Distribution : Palaearctic Subregion, from Central Europe to Japan.

Comments : The supposed autapomorphies of this genus are the shape of the transtilla and the long, weakly sclerotized socius. The transtilla resembles that in *Archips* HBN., but it is not expanded in the middle anteriorly and it is distinctly cup-shaped basally. The elongate valva is probably of convergent importance. The new genus is close to *Ptycholomoides* OBR., but the primitive gnathos (in *Ptycholomoides* its termination is apomorphic) and the different shape of the transtilla are characteristic. The female genitalia resemble those of *Choristoneura* HBN. or *Archips* HBN. Four taxa are known to date, but their status seems unclear. The genital differences are very slight and should be confirmed on more material. The populations of the Far East differ from those of the West Palaearctic in having a simple apex to the aedeagus and a completely membranous ductus bursae. The two populations are treated provisionally as two distinct species each subdivided into two subspecies. The new genus is named in honour of my friend Dr. TOSIRO YASUDA of Osaka.

Tosirips perpulchranus (KENNEL), comb. n.

Tortrix perpulchrana KENNEL, 1901, Dt. ent. Z. Iris, 13 (1900) : 223.

Type-locality : Biskin.

Wing expanse : male, 19-21 mm ; female, 25-27 mm ; costa convex, distal third in male rather straight ; apex very short, rounded ; termen weakly oblique, rather straight. Head ochreous yellow, sometimes with slight admixture of brown, with labial palpus more cream. Ground colour of forewing yellow-ochreous, suffusions and strigulations brownish grey ; pattern dark greyish brown consisting of postbasal, median and subterminal fascia, the latter often incomplete or fused with posterior or dorsal suffusions ; concolorous spot at costa before apex ; fringes paler than ground colour, brown at tornus. Hindwing grey-brown ; fringes pale ochreous cream. The intensity of the forewing suffusion is variable.

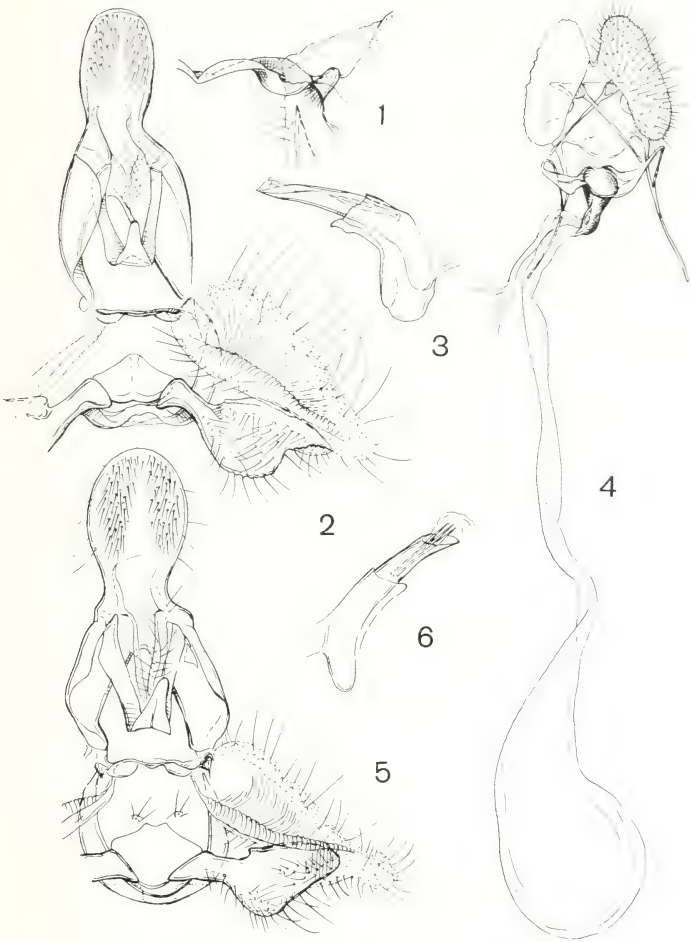
Male genitalia (figs. 1-3) : Uncus elongate, broadest medially, rounded apically ; ventral prominence of sacculus broad, rounded ; aedeagus indistinctly convex at the tip, ventro-laterally ; 3 cornuti in vesica.

Female genitalia (fig. 4) : as described for the genus ; anterior portion of colliculum tapering slightly terminally, with lateral fold extending almost to middle.

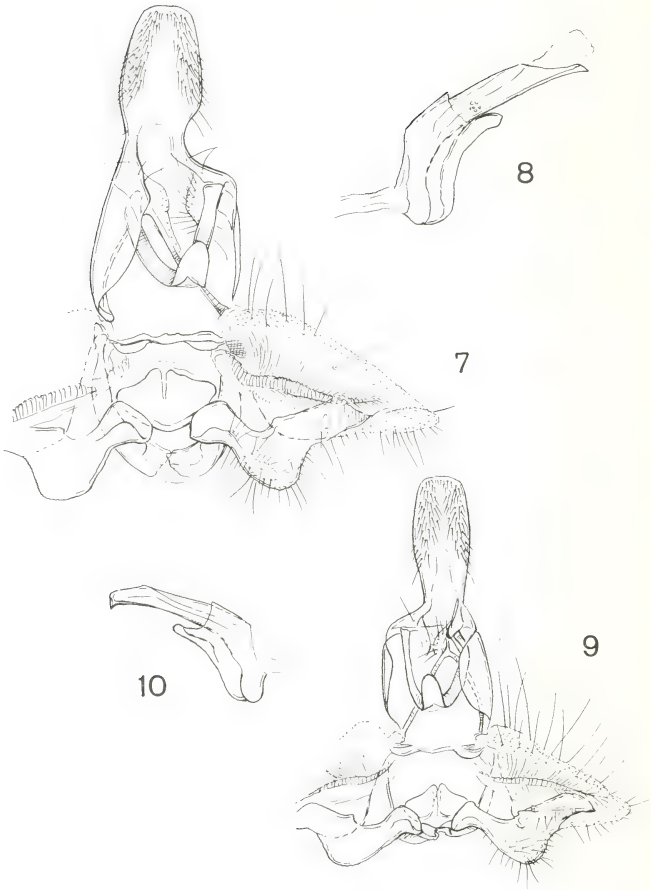
Bionomy : Moths in June, in woods.

Distribution : Amur territory, Primore in USSR, N.E. China and North Korea ; KUZNETSOV (1967) mentions Simonovo as the most northern locality. His data from Japan are probably referable to the following subspecies.

Comments : The above description concerns the nominate subspecies.



Figs. 1-6. Male and female genitalia of *Tosirips* gen. n. : 1-3 — *T. perpulchranus perpulchranus* (KENNEL), South Primore ; 4 — same species, Ussuri Territory ; 5, 6 — *T. perpulchranus ceramus* ssp. n., holotype.



Figs. 7-10. Male genitalia of *Tosirips* gen. n. : 7, 8 – *T. magyarus* sp. n., holotype ; 9, 10 – *T. magyarus syriacus* ssp. n., holotype.

Tosirips perpulchranus ceramus ssp. n.

Wing expanse : 20 mm. Ground colour of forewing ochreous, pale ochreous yellow terminally ; pattern broadly diffuse ; dorsum suffused with brown ; fringes concolorous with terminal part of wing, brown-grey at tornus. Hindwing brown ; fringes brownish.

Male genitalia (figs. 5, 6) : As in the nominate subspecies, but uncus much broader, ovate and ventral edge of sacculus less convex medially. Female and bionomy unknown.

Holotype, male : "25.VI.1957, Mt. Miei, Kyoto, Takeuchi". Paratype : an identically labelled male. Holotype in the collection of the University of Osaka Prefecture, Osaka.

Tosirips magyarus sp. n.

Wing expanse : male, expansion 19 mm ; female, 21 mm. Head and thorax as in *T. perpulchranus*. Ground colour cream ochreous, with transverse ferruginous lines or strigulae, some strigulae and basal suffusion brownish, terminal part of wing suffused with brown. Pattern brown, ferruginous medially. Fringes paler than ground colour or suffused with brownish ; brownish at tornus. Hindwing brown ; fringes cream or whitish-grey, brown-grey in anal area, with brown basal line.

Male genitalia (figs. 7, 8) : As in *T. perpulchranus perpulchranus* but ventral prominence of sacculus more slender and aedeagus provided with a ventro-terminal tooth.

Female genitalia : As in the afore mentioned species but colliculum broader proximally and with very slender cestum developed in anterior part of ductus bursae.

Bionomy : Moths collected in May and June. Larva feeds on *Quercus robur*.

Holotype, male : "Borosjenö, 935.VI.4, Dioszeghy", G.S. 12683 in coll. of Institute of Systematic and Experimental Zoology, PAS, Kraków. Paratypes : 3 males labelled "Bulgaria, Kresna, 31.V.1984, J. Jaroš lgt.".
Known also from Yugoslavia (Serbia).

Tosirips magyarus syriacus ssp. n.

Wing expanse : 16 mm. Head and thorax browner than in nominate subspecies. Ground colour of forewing cream, densely suffused and strigulated with brown, with some transverse lines before and beyond median fascia ; pattern chestnut-brown, in distal part with reddish brown shade. Distal part

of wing strongly suffused ; fringes cream, dark brown at apex and tornus. Hindwing dark brown ; fringes cream-brown, brownish in anal area.

Male genitalia (figs. 9, 10) : As in nominate subspecies but uncus much more slender and terminal tooth of aedeagus larger, directed ventrally.

Holotype, male : "Syrien", G.S. 11604 in the coll. of the Museum für Naturkunde, Humboldt Universität, Berlin.

Literature

KUZNETSOV, V. I., 1967. Listovertki (Lepidoptera, Tortricidae) Amursko-Zeiskogo mezhduretscha i ikh ekologia. *Trudy zool. Inst., Leningr.*, 41 : 1-72.

Book reviews — Buchbesprechungen — Analyses

J. P. KORSHUNOV : *Rhopalocera of the West Siberian Plain*, in *The Spiders and Insects of Siberia*, pp. 32-118. Paperback, 15 × 21 cm, 34 black and white illustrations. Novosibirsk, 1985. In russian, with latin names of species.

This work is the first to provide a complete key to the species of Rhopalocera occurring in the plain of West Siberia from the Urals to the River Jenissei. It comprises 238 species : Hesperiidae 21, Papilionidae 9, Pieridae 28, Lycaenidae 60, Nymphalidae 64 and Satyridae 56.

The work begins with a review of the Rhopalocera of the USSR followed by a section on their morphology. The first key is to the families only. Then for each family a species key is presented which also incorporates a description of each species including the larval foodplants, flight period, degree of abundance and distribution.

Two new species and four new subspecies are described : *Neolycaena falkovitshi* ZHDANKO and KORSHUNOV, *Oeneis patrushevae* KORSHUNOV, *Polyommatus eroides taimyrensis* KORSHUNOV, *Argynnis sagana relicta* KORSHUNOV, *Apatura metis irtyshika* KORSHUNOV and *Clossiana districta mochati* KORSHUNOV. The male genitalia of some difficult Melitaeini are figured. A bibliography and index to the latin generic and specific names complete the work.

This publication is a useful reference work for the determination of the West Siberian butterflies and those of the neighbouring regions. It will also provide important data for the forthcoming red data book of the USSR.

B. Izenbek

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Manuscripts should be sent to the editor : Emmanuel de Bros, lic. jur., «La Fleurie», Rebgasse 28, CH-4102 Binningen/BL, Switzerland.

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Legends for figures and plates should be typed on a separate sheet and placed after the list of references. Line drawings should be about twice their final size. Black waterproof ink should be used. Photographs should be glossy positive prints. Colour plates can only be published at the author's expense.

Publication languages are english, french and german. The editors reserve the right to make minor textual corrections that do not alter the author's meaning.

All manuscripts exceeding three typed pages must include an abstract of no more than 100 words. It is strongly recommended to add a translation of the abstract in at least one of the other publication languages.

The first mention of any organism should include the full scientific name with the author and year of description. New descriptions must conform with the current edition of the International Code of Zoological Nomenclature. We strongly urge deposition of types in major museums, and all type depositions must be cited.

All papers will be read by the editors and submitted for review to two referees.

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Contents – Inhalt – Sommaire

SEL : Sixième Congrès Européen de Lépidoptérologie San Remo 1988 .. 93
A. SCHINTLMEISTER, V. V. DUBATOLOV, A. V. SVIRIDOV, A. YU. TSHISTJAKOV & J. VIIDALEPP : Verzeichnis und Verbreitung der Notodontidae der UdSSR (Lepidoptera) 94
K. MIKKOLA : Biography of Prof. Esko Suomalainen, Honorary member of SEL 113
E. SUOMALAINEN : Autobibliography (Lepidopterological publications) ... 115
J. J. DE FREINA : Eine neu entdeckte Lymantriiden-Art aus Kaschmir : *Arctornis kohistana* sp. n. (Lepidoptera, Lymantriidae) 119
J. RAZOWSKI : On the family-level systematics of the Pterophoridae 127
K. SAITOH : A note on the haploid chromosome number of *Brenthis ino* ROTTEMBURG 1775 from Finland (Lepidoptera, Nymphalidae) 131
Book reviews – Buchbesprechungen – Analyses ..... 133, 134 & 136

Sixth European Congress of Lepidopterology

San Remo, Italy – 6th to 10th April 1988.
Provisional offers of papers should be made to : Prof. Dr. Emilio Balletto, President of the SEL and of the Organisation Committee

Universita di Torino
Dipartimento di Biologia Animale
Via Accademia Albertina, 17
I-10123 Torino, Italy.

Further details on the Congress will be published in NEWS.

Sixième Congrès Européen de Lépidoptérologie

San Remo, Italie – 6 au 10 avril 1988
Les annonces provisoires de communications sont à adresser au Prof. Dr. Emilio Balletto, Président de la SEL et du Comité d'organisation (voir adresse ci-dessus). NOUVELLES publiera des renseignements plus détaillés.

Sechster Europäischer Kongress für Lepidopterologie

San Remo, Italien, vom 6. bis 10. April 1988. Die vorläufige Anmeldung eines Vortrages ist zu richten an Herrn Prof. Dr. Emilio Balletto, Präsident der SEL und des Organisationskomitees (siehe obige Adresse). NACHRICHTEN wird ausfürlichere Informationen veröffentlichen.

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Verzeichnis und Verbreitung der Notodontidae der UdSSR (Lepidoptera)

A. SCHINTLMEISTER, V. V. DUBATOLOV, A. V. SVIRIDOV, A. YU. TSHISTJAKOV & J. VIIDALEPP

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Dr. J. Viidalepp, Zooloogia ja Botaanika Instituut, vanemuise 21, SU-202400 Tartu, Estland

Zusammenfassung

Aus der UdSSR sind bisher insgesamt 128 Arten Notodontidae bekannt. Das vorliegende Verzeichnis enthält dabei acht für die Fauna der UdSSR erstmals nachgewiesene Spezies. Weiterhin wird die Verbreitung der Arten in der Sowjetunion tabellarisch erfaßt und eine Einteilung in Faunenelemente (sensu DE LATTIN) vorgenommen. Im Artikel sind die folgenden taxonomischen Änderungen enthalten :

Summary

A check-list of the 128 species of Notodontidae known from the USSR is presented. Eight species are recorded for the first time. The distribution of the species within the Soviet Union, including the faunal elements (sensu DE LATTIN) to which they belong, is given in table form. The following taxonomic changes are made :

Synonyma (syn. nov.) :

Furcula bicuspis infumata (STAUDINGER, 1887) = *F. bicuspis bicuspis* (BORKHAUSEN, 1790) ;
Neostauropus KIRIAKOFF, 1967 = *Stauropus* GERMAR, 1812 ;
Pheosia karategina STSHETKIN, 1980 = *Pheosia jullieni* OBERTHÜR, 1911 ;
Pheosia fusiformis continentalis TSHISTJAKOV, 1985 = *Pheosia rimosa rimosa* PACKARD, 1864 ;
Pterostoma tachengensis CAI, 1979 = *Pterostoma palpina palpina* (CLERCK, 1759) ;
Paragluphisia DJAKONOV, 1929 = *Gluphisia* BOISDUVAL, 1828.

Neuer taxonomischer Status (stat. nov.) :

Cerura intermedia (TEICH, 1896) (bona species) ;
Furcula furcula lanigera (BUTLER, 1877) (Abwertung zur Unterart) ;

Fusapteryx MATSUMURA, 1920, *Microphalera* BUTLER, 1885 und *Ptilodontella* KIRIAKOFF, 1967 (Abwertung als Subgenera zu *Ptilodon* HÜBNER, 1812) ; *Ptilodon capucina kuwayamae* (MATSUMURA, 1919) (Abwertung zur Unterart) ; *Clostera obscurior* (STAUDINGER, 1887) (bona species).

1. Einleitung

Die fortschreitende faunistische Erforschung, auch abgelegener Teile der UdSSR erbrachte in den letzten Jahren eine Reihe von interessanten Notodontidenfunden. Insbesondere ist hier die intensive Untersuchung der fernöstlichen und sibirischen Fauna zu erwähnen. Mit vorliegender Übersicht wird versucht, die Erkenntnisse der letzten Jahre zusammenzufassen und damit zugleich auch einen Beitrag zur Inventarisierung der Fauna der UdSSR zu leisten.

2. Dank

Unsere Arbeit wurde von zahlreichen Kollegen unterstützt. Besonders bedanken möchten wir uns bei den Herren : A. G. ANISKOWITSCH (Brjansk), Dr. R. Qu. CAI (Institute of Zoology, Academia Sinica, Beijing), O. GORBUNOV (Moskau), Prof. Dr. H.-J. HANNEMANN (Zoologisches Museum der Humboldt-Universität zu Berlin), A. HELIA (Tupesy, CSSR), S. KINOSHITA (Osaka), Y. KISHIDA (Tokyo), V. G. MACHAT (Moskau), Dr. A. N. POLTAWSKI (Entomologische Abteilung des Staatlichen Botanischen Garten Rostov/Don), Dr. D. STÜNING (Zoologisches Museum Alexander Koenig, Bonn), Dr. Sh. SUGI (Tokyo), A. WATSON (British Museum Natural History), Th. WITT (München).

3. Verbreitungsangaben und Material

Das behandelte Gebiet umfaßt das heutige Staatsgebiet der UdSSR. Es wurde versucht den bisherigen Kenntnisstand der Verbreitung der einzelnen Taxa tabellarisch darzustellen. Bezüglich der Verbreitung der Arten im europäischen Teil der UdSSR und im Kaukasus sei dabei auf die Arbeit von SCHINTLMEISTER (1982) verwiesen. In bestimmten Fällen sind spezielle Fundortangaben in den Bemerkungen zu einzelnen Arten erwähnt.

Das vorliegende Verzeichnis basiert auf nachprüfbaren Belegexemplaren ; nicht verifizierbare Meldungen sind als solche ausdrücklich gekennzeichnet. Die Verbreitungsangaben wurden von den Autoren gemeinsam erarbeitet, wobei alle wichtigen Museumsammlungen in der UdSSR und ein erheblicher Teil der bedeutenderen Privatsammlungen erfaßt sind. Darüberhinaus wurden von SCHINTLMEISTER über 20 der bedeutensten europäischen und japanischen Sammlungen, die Notodontidae der Palaearktis enthalten überprüft.

Die Anteile der einzelnen Autoren an Verbreitungsangaben gliedern sich schwerpunktmäßig wie folgt :

DUBATOLOV : Westsibirien (incl. Altaij), Baikal, Jakutien ;
SCHINTLMEISTER : Europäischer Teil der UdSSR, Kaukasus, Transkaukasus, Sajan Mts., Amur ;
SVIRIDOV : Amurgebiet, coll. Tsvetaev ;
TSHISTJAKOV : Primorye, Priamur, Sachalin, Kurilen, Kamtshatka.
VIIDALEPP : Europäischer Teil der UdSSR, Mittelasien, Tuva, Azerbaidshan, Sachalin, Kurilen ;

Natürlich wurden von den einzelnen Mitarbeitern auch Angaben aus anderen Gebieten als den oben erwähnten übermittelt.

Schätzungsweise sind ca. 60-80 000 Exemplare in die Auswertung einbezogen.

4. Systematik und Nomenklatur

Möglichst alle nomenklatorisch gültigen Taxa, die im Untersuchungsgebiet zweifelsfrei vorkommen, sollten erfaßt werden. Dabei sind auch Unterarten (a, b, c) mitberücksichtigt. Um phylogenetischen Zusammenhängen besser gerecht zu werden, haben wir teilweise erhebliche Umstellungen vom Systemvorschlag nach KIRIAKOFF (1967) vorgenommen.

Zum besseren Verständnis sind einige Synonyma (in Klammern) dem Verzeichnis beigefügt.

5. Systematisches Verzeichnis der Notodontidae der UdSSR (*Kommentare*) [*Abbildung*]

Torigea MATSUMURA, 1924

1. straminea (MOORE, 1877)

Mimopydna MATSUMURA, 1924

2. pallida (BUTLER, 1877)

Cerura SCHRANK, 1802
(= *Dicranura* auct.)

3a. vinula vinula (LINNAEUS, 1758) (1)
b. vinula estonica (HUENE, 1905)
4. felina BUTLER, 1877
5. intermedia (TEICH, 1896), STAT. NOV.
6. przewalskyi ALPHERAKY, 1882 (2) [2.2]
7. himalayana MOORE, 1888 (3) [2.1]
8a. erminea erminea (ESPER, 1783) (4)
b. erminea candida (STAUDINGER, 1892)

Furcula LAMARCK, 1816
(= *Harpyia* auct.)

9a. furcula furcula (CLERCK, 1759)
b. furcula forficula (FISCHER v. WALDHEIM, 1820)
c. furcula caucasica (SCHINTLMEISTER, 1981)
d. furcula pseudobicuspis DANIEL, 1938

e. furcula lanigera (BUTLER, 1877) STAT. NOV. (5)
10. bicuspis (BORKHAUSEN, 1790) (6)
(= *infumata* STAUDINGER, 1887 SYN. NOV.)
11. aeruginosa (CHRISTOPH, 1873)
12. sibirica (DANIEL, 1965) [1.1]
13. petri (ALPHERAKY, 1882) (7) [1.2]
14. bifida (BRAHM, 1787)
(= *hermelina* GOEZE, 1781 nec GOEZE 1781)
15. interrupta (CHRISTOPH, 1867) (8)

Stauropus GERMAR, 1812
(= *Neostauropus* KIRIAKOFF, 1967 SYN. NOV.)

16a. fagi fagi (LINNAEUS, 1758)
b. fagi persimilis BUTLER, 1879
17. basalis MOORE, 1877

Cnethodonta STAUDINGER, 1887

18. grisescens STAUDINGER, 1887

Uropyia STAUDINGER, 1892

19. meticulodina (OBERTHÜR, 1884)

Harpyia OCHSENHEIMER, 1810
(= *Hoplitis* HÜBNER, [1819] 1806 nec. KLUG, 1807)
(= *Hybocampa* LEDERER, 1853)

20. milhauseri (FABRICIUS, 1775)
21. umbrosa (STAUDINGER, 1892)
22. tokui (SUGI, 1977)
(= *monochroma* TSHISTJAKOV, 1977)

Dicranura REICHENBACH, 1817
(= *Exaereta* HÜBNER, [1820] 1806)

23. ulmi (DENIS & SCHIFFERMÜLLER, 1775)
24. tsvetaevi SCHINTLMEISTER & SVIRIDOV, 1985 [1.3]

Fentonia BUTLER, 1881

25. ocypete (BREMER, 1861)

Hemifentonia KIRIAKOFF, 1967

26. mandschurica (OBERTHÜR, 1911) [1.4]
(= *fasciculata* FILIPJEV, 1927)

Wilemanus NAGANO, 1916

27. bidentatus (WILEMAN, 1911) (9)

Notodonta OCHSENHEIMER, 1810
(= *Tritophia* KIRIAKOFF, 1967)
(= *Eligmodonta* KIRIAKOFF, 1967)

28a. dromedarius dromedarius (LINNAEUS, 1767)
b. dromedarius schintlmeisteri WITT, 1980
c. dromedarius pontica WITT, 1980 [1.6]
29. stigmatica MATSUMURA, 1920
30. dembowskii (OBERTHÜR., 1879)
(= *rothschildi* WILEMAN & SOUTH, 1916)
31. torva (HÜBNER, 1803)
32. jankowskii OBERTHÜR, 1879
33a. tritophus tritophus (DENIS & SCHIFFERMÜLLER, 1775)
b. tritophus phoebe (SIEBERT, 1790)
c. tritophus tiefi BARTEL, 1903
34a. ziczac ziczac (LINNAEUS, 1758)
b. ziczac gigantea (SCHINTLMEISTER, 1981)

Peridea STEPHENS, 1828

35. anceps (GOEZE, 1781)
36. murina KIRIAKOFF, 1974 (10) [1.7]
37. lativitta (WILEMAN, 1911)
(= *pacifica* MOLTRECHT, 1914)
38. gigantea BUTLER, 1877
(= *monetaria* OBERTHÜR, 1879)
39. oberthueri (STAUDINGER, 1892)
40. moltrechti (OBERTHÜR, 1911)
(= *kotschubeji* SHELJUZHKO)

41. graeseri (STAUDINGER, 1892)
(= *arnoldi* OBERTHÜR, 1911)
42. aliena (STAUDINGER, 1892)

Drymonia HÜBNER, [1819] 1816
(= *Ochrostigma* HÜBNER [1819] 1816)
43. dodonaea (DENIS & SCHIFFERMÜLLER, 1775)
44. dodonides (STAUDINGER, 1887)
45. ruficornis (HUFNAGEL, 1766)
(= *chaonia* HÜBNER, 1800)
46. obliterata (ESPER, 1785)
(= *melagona* BORKHAUSEN, 1790)
47. japonica (WILEMAN, 1911)
48. querna (DENIS & SCHIFFERMÜLLER, 1775)
49. [velitaris (HUFNAGEL, 1766)] (11)
a. velitaris pontica (REBEL, 1908)
50. moyaerii (EBERT, 1971) COMB. NOV. (12) [1.5]

Pheosiopsis BRYK, 1950
(= *Suzukia* MATSUMURA, 1920 nec. OKAMOTO, 1913)
(= *Suzukiana* SUGI, 1976)
51. [cinerea (BUTLER, 1879)]
a. cinerea ussuriensis (MOLTRECHT, 1914)

Pheosia HÜBNER, 1819
52. tremula (CLERCK, 1759)
53. teheranica DANIEL, 1965 (13) [2.4]
54. grummi (CHRISTOPH, 1885) [2.3]
(= *brandti* O. B. HAAS 1937)
55. jullieni OBERTHÜR, 1911 (14) [2.5]
(= *karategina* STSHETKIN, 1980, SYN. NOV.) [2.6]
56. gnoma (FABRICIUS, 1777)
(= *dictaeoides* ESPER, 1789)
57. fusiformis MATSUMURA, 1921
58. rimosa PACKARD, 1864 (15)
(= *fusiformis continentalis* TSHISITJAKOV, 1985, SYN. NOV.)

Paradrymonia KIRIAKOFF, 1967
59. vittata STAUDINGER, 1892
a. vittata nigroramosa (CHRISTOPH, 1893) COMB. NOV. (16) [1.8]

Pterostoma GERMAR, 1812
60. palpina (CLERCK, 1759) (17)
(= *tachengensis* CAI, 1979 SYN. NOV.)
61. sinicum (MOORE, 1877)
62. griseum (BREMER, 1861)

Shaka MATSUMURA, 1920
63. attrovittatus (BREMER, 1861)

Lophocosma STAUDINGER, 1887
64. atriplaga STAUDINGER, 1887

Hupodonta BUTLER, 1877
65. corticalis BUTLER, 1877
66. lignea MATSUMURA, 1919 (18)

Nerice WALKER, 1855
68. bipartita BUTLER, 1885
69. leechi STAUDINGER, 1892

Semidonta STAUDINGER, 1892
70. biloba (OBERTHÜR, 1880)

Epodonta MATSUMURA, 1922
71. lineata (OBERTHÜR, 1880)

Rabtala DRAESEKE, 1926
(= *Lampronadata* KIRIAKOFF, 1967)
72. cristata (BUTLER, 1877)
73. splendida (OBERTHÜR, 1880)

Urodonta STAUDINGER, 1887
74. albimacula STAUDINGER, 1887
75. arcuata ALPHERAKY, 1897
76. branickii (OBERTHÜR, 1880)
77. viridimixta (BREMER, 1861)

Allodonta STAUDINGER, 1887
78. plebeja (OBERTHÜR, 1880)

Hexafrenum MATSUMURA, 1925
79. leucodera (STAUDINGER, 1892)

Epinotodonta MATSUMURA, 1920

80. fumosa (MATSUMURA, 1919)

Takadonta MATSUMURA, 1920

81. takamukui MATSUMURA, 1920

Ptilodon HÜBNER, 1822 (19)
(= *Lophopteryx* STEPHENS, 1828)
(= *Microphalera* BUTLER, 1885)
(= *Fusapteryx* MATSUMURA, 1920)
(= *Ptilodontella* KIRIAKOFF, 1967)

82a. capucina capucina (LINNAEUS, 1758) (20)
b. capucina kuwayamae (MATSUMURA, 1919) STAT. NOV.
83. robusta (MATSUMURA, 1924)
84. jezoensis (MATSUMURA, 1919)
85. hoegel (GRAESER, 1888)
86. cucullina (DENIS & SCHIFFERMÜLLER, 1775)
(= *cuculla* ESPER, 1786)
87. saerdabensis (DANIEL, 1938) (21) [3.4]
88. ladislai (OBERTHÜR, 1880) COMB. NOV.
89. grisea (BUTLER, 1885) COMB. NOV.

Lophontosia STAUDINGER, 1892

90. cuculus (STAUDINGER, 1892)

Odontosia HÜBNER, 1819

91. carmelita (ESPER, 1790)
92. patricia STICHEL, 1918 [3.3]
93. sieversii (MENETRIES, 1856)
(= *sieversii* f. *arnoldiana* KARDAKOFF 1928)

Hagapteryx MATSUMURA, 1920

94. admirabilis (STAUDINGER, 1887) [3.2]
95. kishidai NAKAMURA, 1978 (22) [3.1]

Togopteryx MATSUMURA, 1920

96. velutina (OBERTHÜR, 1880)

Jurivalentinia STSHETKIN, 1980

97. karaganaeca STSHETKIN, 1980

Ptilophora STEPHENS, 1928

98. plumigera (DENIS & SCHIFFERMÜLLER, 1775)
99. nohirae (MATSUMURA, 1920)
100. [jezoensis (MATSUMURA, 1920)]
a. jezoensis sutchana O. B. HAAS, 1927

Himeropteryx STAUDINGER, 1887

101. miraculosa STAUDINGER, 1887

Leucodonta STAUDINGER, 1892

102a. bicoloria bicoloria (DENIS & SCHIFFERMÜLLER, 1775)
b. bicoloria albida (BOISDUVAL, 1834)

Phalera HÜBNER, 1819

103. bucephala (LINNAEUS, 1758)
104. bucephaloides (OCHSENHEIMER, 1810) (23)
105. flavescens (BREMER & GREY, 1853)
106. assimilis (BREMER & GREY, 1853)

Phalerodonta STAUDINGER, 1892

107. bombycina STAUDINGER, 1892

Spatalia HÜBNER, 1819

108. argentina (DENIS & SCHIFFERMÜLLER, 1775)
109. doeriesi GRAESER, 1888
110. dives OBERTHÜR, 1884
111. plusiotis OBERTHÜR, 1880

Pterotes BERG, 1901
(= *Pteroma* STAUDINGER, 1896 nec. HAMPSON, 1893)
(= *Danielita* KIRIAKOFF, 1970)
112. eugenia STAUDINGER, 1896)

Abb. 1.

1. *Furcula sibirica* DANIEL : ♂, SU-W. Sajan Mts., Maina-Babik, 6.vii.-14c.vii.1979 leg. MACHAT.
2. *Furcula petri* ALPHERAKY : ♂, SU-Tuva, Ak-Dovunik, Barum, 3.-6.viii.1972 leg. RUBEN & VIIDALEPP.
3. *Dicranura tsvetaevi* SCHINTLM. & SVIRIDOV : ♂, SU-Primorye, Keldrowaja Pad bei Wladiwostock, 1.vi.1964 leg. TSVETAEV. Paratypus.
4. *Hemifentonia mandschurica* OBERTHÜR : ♀, SU-Primorye, 10 km N Zanadvorovka, 1.viii.1984 leg. TSHISTJAKOV.
5. *Drymonia moyaerii* EBERT : ♂, SU-Azerbaidshan, Lenkoran-Alekseevka, 10.iv.1982.
6. *Notodonta dromedarius pontica* WITT : ♂, SU-Kaukasus, Suchumi, 7.viii.1983 leg. FELIX.
7. *Peridea murina* KIRIAKOFF : ♂, SU-Azerbaidshan, Lenkoran-St. subtrop. Kulturi 30.iv.1970 leg. TSVETAEV.
8. *Paradrymonia vittata nigroramosa* CHRISTOPH : ♂, Transcaspia, Arwas bei Aschabad, 6.-18.v.1900.

Eguria (MATSUMURA, 1924)

113. ornata (OBERTHÜR, 1884)

Gluphisia BOISDUVAL, 1828
(= *Paragluphisia* DJAKONOV, 1929 SYN. NOV.)

114. crenata (ESPER, 1785)
(= *amurensis* GRÜNEBERG, 1912)
115. oxiana (DJAKONOV, 1929) COMB. NOV. (24)

Rhegmatophila STANDFUSS, 1888

116. aussemi WITT, 1981 [3.5]

Pygaera OCHSENHEIMER, 1810

117. timon (HÜBNER, 1803)

Clostera SAMOUELLE, 1819
(= *Pygaera* auct.)

118. curtula (LINNAEUS, 1758)
119. [albosigma (FITCH, 1855)]
a. albosigma curtuloides (ERSCHOFF, 1870)
120. pigra (HUFNAGEL, 1766)
121. obscurior (STAUDINGER, 1887) STAT. NOV. (25) [4.2]
122. anachoreta (DENIS & SCHIFFERMÜLLER, 1775)
123. modesta (STAUDINGER, 1889) [3.6]
124. anastomosis (LINNAEUS, 1758)

Micromelalopha NAGANO, 1916

125. troglodyta (GRAESER, 1890) [4.3/5]
(= *opertum* TSHISTJAKOV, 1977)
126. sieversi (STAUDINGER, 1892) [4.4]
127. flavomaculata TSHISTJAKOV, 1977 [4.6]

Gonoclostera BUTLER, 1877

128. timoniorum (BREMER, 1861)

6. Kommentare

1. *C. vinula*: Zu diesem taxonomisch schwierigen Komplex, der einen Artenkreis bildet, gehören u.a. auch *felina, himalayana, przewalskyi* und *intermedia*. C. *intermedia* kann wegen der von *vinula* stark abweichenden Eimorphologie (das Ei von *intermedia* ähnelt dem von *erminea*) als eigene Art aufgefaßt werden (ungeachtet der Genitalunterschiede).

2. *C. przewalskyi*: Die polytypische Art kommt vom Altaij bis Afghanistan (ssp. *amseli* DE LATTIN, ROESLER & BECKER, 1977 comb. nov.) vor. Besonders in Mittelasien finden sich mehrere habituell voneinander abweichende Formen.

3. *C. himalayana*: Aus Tadschikistan (Tigrovaja Balka) und Turkmenien (Amu Daja, Lambe) liegen mehrere Belege vor, die gut zum Typus (im British Museum (Natural History) verglichen) passen. Die Art ist neu für die UdSSR.

4. *C. erminea*: Aus dem Kaukasus wurde das Taxon *teberdina* KORNEJEV, 1939 beschrieben. Da die Art im Kaukasus anscheinend noch nie gefunden wurde, könnte es sich um eine Verwechslung mit *vinula* handeln. Das Vorkommen der ähnliche C. *menciana* MOORE, 1877 in der UdSSR konnte bislang nicht zweifelsfrei nachgewiesen werden. Es ist aber anzunehmen, daß die Art noch im Fernen Osten gefunden wird. Die Meldung von *menciana* (TSHISTJAKOV, 1979) erwies sich als *erminea*.

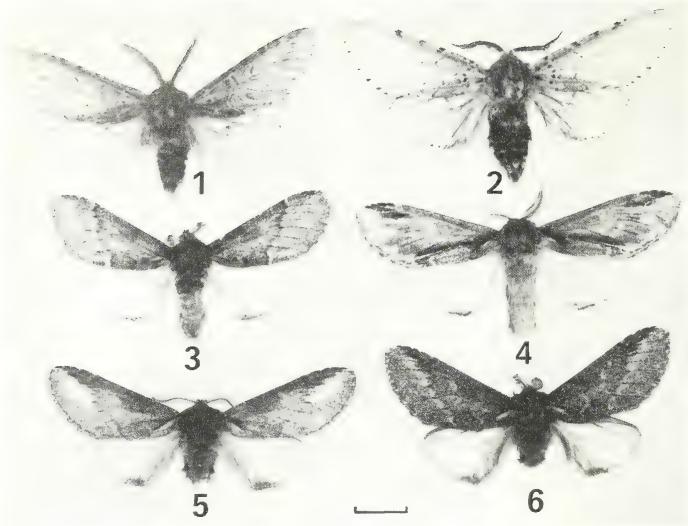


Abb. 2.

1. *Cerura himalayana* MOORE : ♂, SU-Tadshikistan, Tigrovaja Balka, 1.-3.iv.1977 leg. RAITVIIR.
2. *Cerura przewalskyi* ssp. : ♂, SU-Pamir, Chorog, 26.vi.1967.
3. *Pheosia grummi* CHRISTOPH : ♂, SU-Armenien, Daralaged, 30.v.1984.
4. *Pheosia teheranica* DANIEL : ♂, SU-Azerbaidshan, Ordubad, Unus, 6.vi.1967.
5. *Pheosia jullieni* OBERTHÜR : ♂, SU-Kirgisien, Arkit, 22.v.1968.
6. *Pheosia jullieni* f. *karategina* STHETKIN : ♂, SU-Tadshikistan, Dushanbe, Ramit, 8.-13.iv.1977 leg. RAIVIIR.

5. *F. furcula lanigera*: Zoogeographische Überlegungen (Holarktische Verbreitung von *furcula* wobei der Ferne Osten und Sibirien von *lanigera* besiedelt wird) aber auch habituelle Ähnlichkeiten veranlassen uns, *lanigera* als Unterart von *furcula* aufzufassen.

6. *F. bicuspis*: Vergleichende Untersuchungen ergaben, daß im Fernen Osten zu einem geringen Prozentsatz (ca. 20%) leicht gelblich getönte Exemplare vorkommen, die als f. *infumata* (infrasubspezifische Kategorie) bezeichnet werden können.

7. *F. petri*: Die individuell stark variierende Art bildet offensichtlich mehrere Unterarten aus. Das derzeitige zur Verfügung stehende dürftige Material erlaubt es aber noch nicht eine Gliederung der Unterarten vorzunehmen.

8. *F. interrupta*: DANIEL (1965) und auch andere Autoren melden verschiedentlich die der *interrupta* ähnliche *F. syra* GRUM-GRSHIMAILO, 1899 aus der Wolgagegend (Sarepta). Es erwiesen sich jedoch alle untersuchten Belege aus der UdSSR immer als zu *interrupta* zugehörig. *F. syra* kann deshalb nicht mit in das Verzeichnis aufgenommen werden.

9. *W. bidentatus*: Die Art tritt in zwei Formen, einer hellen und einer dunklen (*ussuriensis* PÜNGELER, 1912) auf. Genitalunterschiede zwischen beiden Formen wurden nicht gefunden. In Japan kommt nur die helle, in der UdSSR nur die dunkle Form vor. In Korea und in Teilen Chinas fliegen beide Morphen aber sympatrisch, so daß es sich nicht um Unterarten handeln kann.

10. *P. murina*: Die Art wird erstmals aus der UdSSR gemeldet. Belege liegen aus Azerbaidshan (Lenkoran, Alexeevka bzw. Talysh, Dasdatuk) vor.

11. *Dr. velitaris*: Aus der UdSSR kennen wir bislang nur Belege aus dem Kaukasus, die zur ssp. *pontica* gehören. Vermutlich dürfte aber die ssp. *velitaris* im europäischen Teil der UdSSR (Ukraine) noch aufzufinden sein.

12. *Dr. moyaerii*: Diese aus dem Iran beschriebene Art fliegt auch im sowjetischen Teil Azerbaidshans (Lenkoran, Alexeevka). *Dr. moyaerii* ist neu für die UdSSR.

13. *Ph. teheranica*: In coll. SCHINTLMEISTER befindet sich ein Exemplar aus Azerbaidshan, Ordubad, s. Unus vor. Es handelt sich um den Erstnachweis für die UdSSR.

14. *Ph. jullieni*: Ein Vergleich von authentischen Exemplaren (der Holotypus war leider nicht zugänglich) von *Ph. karategina* vom Locus typicus mit *Ph. jullieni* (einschließlich des genitalisierten Holotypus im BMNH) erbrachte nur geringe Färbungsunterschiede. Für *jullieni* sind violettgraue Vorderflügel typisch, bei *karategina* sind sie mehr schwärzlich-grau. Das Taxon *karategina* ist demnach als Synonym zu *jullieni* aufzufassen.

15. *Ph. rimosa*: TSHISTJAKOV beschrieb 1985 *Pheosia fusiformis continentalis*. Es handelt sich hierbei aber um die aus Nordamerika bekannte *Ph. rimosa*, so daß *continentalis* als Synonym zu *rimosa* tritt, da sich die Populationen Nordamerikas und der UdSSR anscheinend nicht unterscheiden.

16. *P. vittata nigroramosa*: Eine Genitaluntersuchung ergab die Konspezifität von *nigroramosa* mit *vittata*.

17. *Pt. palpina*: TSHISTJAKOV (1985) meldet *tachengensis* aus Sachalin. Nachdem sich *tachengensis* jedoch als Synonym von *palpina* erwiesen hat (die Beschreibung erfolgte unter Bezug auf eine nicht korrekte Genitaldarstel-

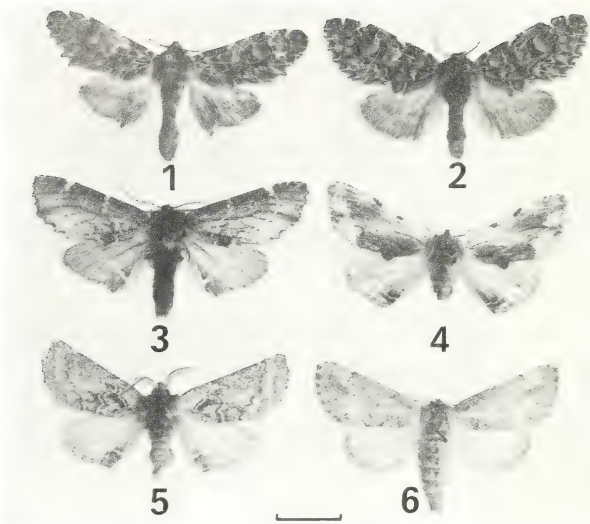


Abb. 3.

1. *Hagapteryx kishidai* NAKAMURA : ♂, SU-Primorye, Kedrowaja Pad bei Wladiwostock, 22.vii.1963 leg. TSVETAEV.
2. *Hagapteryx admirabilis* OBERTHÜR : ♂, Japan-Abo-Pass bei Kyotoy, 26.vii.1977 leg. KINOSHITA.
3. *Odontosia patricia* STICHEL : ♂, SU-Primorye, 20 km SE Ussurijsk, 25.v.1979 leg. TSHISTJAKOV.
4. *Ptilodon saerdabensis* DANIEL : ♂, SU-Armenien, Sevanski Pereval, Dilizan, 1600-2100 m, 3.vii.1977 leg. FELIX.
5. *Rhegmatophila aussemi* WITT : ♂, SU-Kirgisien, Arkit, 22.v.1968.
6. *Clostera modesta* STAUDINGER : ♀, SU-Kirgisien, Arkit, 9.viii.1967.

lung in KIRIAKOFF (1967) (CAI *in litt* 1984), bleibt die Identität der beiden Tiere noch zu klären. Es kann sich hierbei auch um eine eigene Art oder Unterart (Genitalunterschiede, Verbreitungslücke) handeln.

18. *H. lignea*: Die Art wird von KIRIAKOFF (1967) vom Amurgebiet gemeldet. Von dort ist sie uns aber bislang nicht bekannt. Dagegen fand DUBATOLOV neuerdings ein Männchen von *lignea* in der Sammlung des Zoologischen Institutes in Novosibirsk (Kunashir, 10.VII.1968). Das Tier wurde von TSHISTJAKOV geprüft.

19. *Ptilodon*: Die Arten der Gattung *Ptilodon* sind habituell einander ziemlich ähnlich, weisen jedoch bedeutende Genitalunterschiede auf, die zur

Einteilung und Beschreibung in mehrere Gattungen Anlaß gab. Wir halten es für unzweckmäßig die zahlreichen Arten in monotypische Genera zu stellen, zumal sich in den Genitalien auch Übergänge zeigen. Die Taxa *Ptilodontella, Fusapteryx.* und *Microphalera* könnten aber bei Bedarf als Subgenera angewandt werden.

20. *Pt. capucina*: Das Taxon *kuwayamae* unterscheidet sich habituell von europäischen *capucina*-Populationen nicht. Im Genitalbereich fällt aber der viel längere Uncus auf (die anderen Genitalmerkmale unterliegen einer bedeutenden individuellen Variabilität).

21. *Pt. saerdabensis*: Die Art läßt sich nur durch Genitaluntersuchungen von *cucullina* trennen. Die Genitalunterschiede (Valven, Aedoeagus) sind jedoch wesentlich größer als zwischen *capucina* und *kuwayamae.* Trotzdem kann der Artstatus von *saerdabensis* noch nicht als völlig gesichert betrachtet werden.

P. saerdabensis liegt uns in Anzahl von folgenden Orten im Kaukasus vor (sämtliche durch Genitaluntersuchungen bestätigt): Maikop, Nalchik, Alagir, Dombai, Teberda, Sevankij pr. Es handelt sich um die erste Meldung aus der UdSSR.

22. *H. kishidai*: Die von den Tshushima-Inseln beschriebene, später in Honshu und (unveröff.) China nachgewiesene schmalflügelige Art kommt auch nicht selten in der UdSSR vor (Erstnachweis). Wir haben einen Beleg von Kedrowaja Pad (bei Wladiwostock) 31.VIII.1963 leg. TSVETAEV genitalisiert.

23. *Ph. bucephaloides*: VIIDALEPP untersuchte ein Männchen aus dem Kaukasus im Zoologischen Museum Leningrad. Es handelt sich um den ersten sicheren Beleg aus der UdSSR. Die Meldung von KORSHUNOV & KUMAKOV (1979) erscheint zweifelhaft, solange kein Beleg bekannt ist (der Fundort Saratov liegt weit außerhalb des bekannten Areals der südmediterran – kleinasiatisch verbreiteten Art).

24. *Gl. oxiana*: *Gl. oxiana* und *crenata* ähneln einander habituell und auch genitaliter. Ein eigenes Genus *Paragluphisia* für *oxiana* erscheint deshalb überflüssig.

25. *Cl. obscurior*: Dieses, urprünglich als Varietät von *pigra* beschriebene Taxon, konnte in einer Serie im Zoologischen Museum der Humboldt-Universität zu Berlin inklusive des Typus untersucht werden. Am Status als Art kann alleine schon durch den distinkten Habitus kein Zweifel bestehen. Es wurden auch Genitalunterschiede (Uncusregion) gefunden.

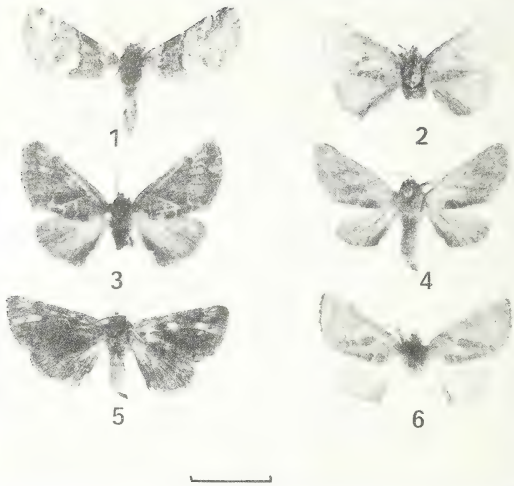


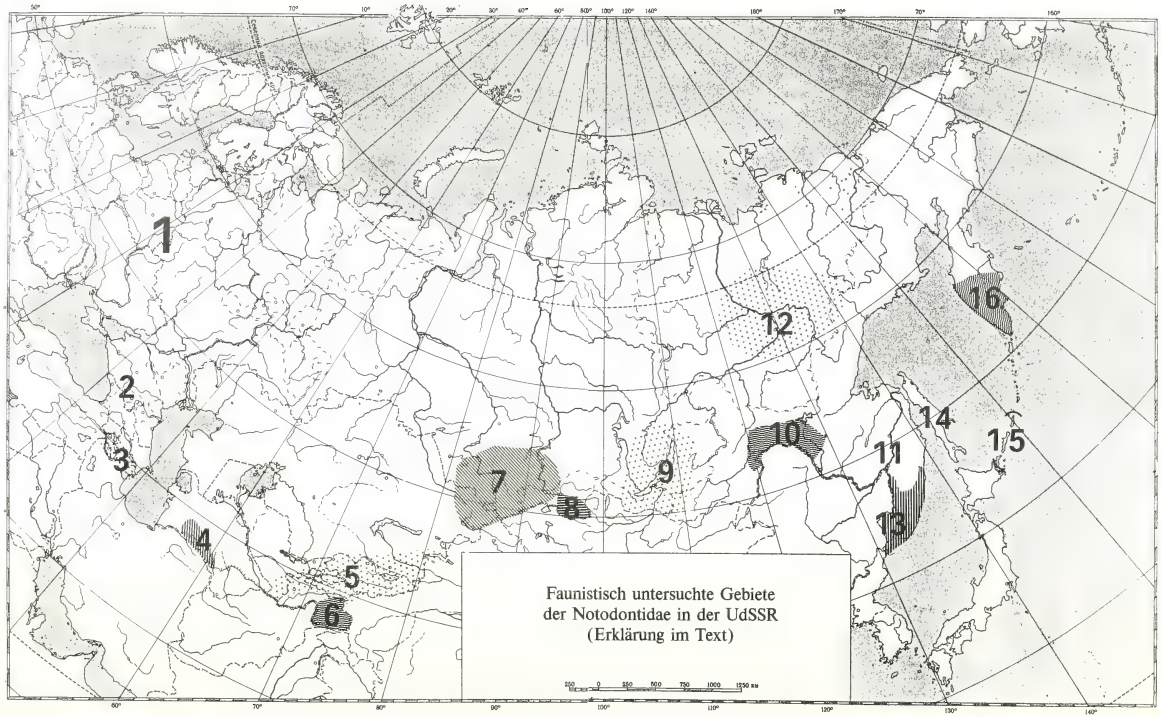
Abb. 4.

1. *Gluphisia oxiana* DJAKONOV : ♂, SU-SW Tadshikistan, Tigrowaja Balka, 16.viii.1958 leg. TSVETAEV.
2. *Clostera obscurior* STAUDINGER : ♂, Thian-Shan.
3. *Micromelalopha troglodyta* GRAESER : ♂, Japan-Nagano Pref., Nishino, Kaida-mura, 2.vi.1975 leg. KISHIDA.
4. *Micromelalopha sieversi* STAUDINGER : ♂, SU-Primorye, Ussurijsk, Kamenushka, 10.-17.vi.1984.
5. *Micromelalopha troglodyta* GRAESER : ♂, SU-Primorye, Kedrowaja Pad bei Wladiwostock, 2.vii.1974 leg. KONONENKO. Paratypus von *Micromelalopha opertum* TSHISTJAKOV.
6. *Micromelalopha flavomaculata* TSGHISTJAKOV : ♂, Japan-Niigata. Akadani, e.l. 6.x.1968 leg. SATO.

7. Verbreitung und Zoogeographie

	Untersuchte Gebiete (siehe Karte)																Faunen-
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	element
T. straminea															×		7
M. pallida															×		7
C. vinula	a, b	a							a			a					5
felina										×	×		×	×	×		6
intermedia			×	×													3
przewalskyi					×	×	×										4
himalayana					×												4 (?)
erminea	a						a	a		a	a		b			a	6

	Untersuchte Gebiete (siehe Karte)																Faunen-
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	element
F. furcula	a, b	c	d				e	e	e	e	e	e	e	e	e	e	5, 6
bicuspis	×						×	×	×	×	×	×	×	×	×	×	6
aeruginosa	×																3 (?)
sibirica								×	×								5
petri					×	×	×										4 (5)
bifida	×	×			×		×		×								5
interrupta	×	×	×														3 (2, 4)
St. fagi	a	a	a								b		b	b	b		7 (1, 6)
basalis													×	×			7
Cn. grisescens											×		×	×	×		6 (7)
U. meticulodina											×		×				6 (7)
H. mi!hauseri	×	×															1
umbrosa													×		×		6
tokui													×				7
D. ulmi	×	×	×	×													1 (2)
tsvetaevi													×				6
F. ocypete										×	×		×		×		7 (6)
H. mandschurica											×		×				6
W. bidentatus													×				7
N. dromedarius	a	b	c				a	a	a								1, 3
stigmatica														×	×		7
dembowskii							×	×	×	×	×	×	×	×	×	×	6
torva	×						×	×	×	×	×		×	×	×	×	6
jankowskii											×		×				6
tritophus	a, b	a					c										1 (5)
ziczac	a	b	b		a		a		a			×					5
P. anceps	×	×															1
murina			×														3
lativitta										×	×		×		×		7
gigantea										×	×		×	×	×		6
oberthueri										×	×		×	×	×		6
moltrechti										×	×		×		×		6
graeseri											×		×		×		6
aliena													×		×		6
Dr. dodonaea	×	×															1
dodonides											×		×				6
ruficornis	×																1
obliterata		×															1
japonica													×				7
querna	×																1
velitaris		×															1
Ph. cinerea											×		×		×		7
Ph. tremula	×	×					×										5
teheranica			×														3
grummi			×														3
jullieni					×												4
gnoma	×						×	?	×	×							5
fusiformis														×	×		7
rimosa							×		×		×	×	×				6 (?)
P. vittata				a													1
Pt. palpina	×	×	×		×		×		×				× (?)				5
sinicum											×		×				7 (6)
giseum									×	×	×		×				6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16
Faunistisch untersuchte Gebiete
der Notodontidae in der UdSSR
(Erklärung im Text)

Die Signaturen, a, b, c etc., geben die Verbreitung der verschiedenen Unterarten für die jeweilige Region an. Kommt nur die Nominatunterart in der UdSSR vor wurde „×" verwendet. Die Nummern der Spalten in der Tabelle bezeichnen die folgenden Gebiete (Vergleiche auch Karte):

1. Europäischer Teil der UdSSR
2. Kaukasus (mit Armenien und Grusinien)
3. Azerbaidshan
4. Kopet Dagh
5. Thian Shan (mit nördl. Ausläufern)
6. Pamir
7. Westsibirien (mit Altaij und W. Sajan)
8. Tuva
9. Baikal
10. Oberer Amur
11. Priamur
12. Nordostsibirien (Jakutien, nördl. 60 n.B.)
13. Primorye
14. Sachalin
15. Südkurilen (Kunashir, Iturup)
16. Kamtschatka (Südteil)

Die Verbreitung der Notodontiden des europäischen Teil der UdSSR wurde bereits von SCHINTLMEISTER (1982) detailliert, tabellarisch dargestellt.

Die Zugehörigkeit zu Faunenelementen wurde nach DE LATTIN (1967) und VARGA (1977) bestimmt. Dabei konnte bei dieser ersten, noch groben Übersicht nicht auf Details (besonders Sekundärzentren) eingegangen werden. In einigen Fällen erscheint die Zuordnung auch nicht ganz eindeutig. Alternative Zuordnungsmöglichkeiten sind in Klammern angegeben. Die Zahnspinner der UdSSR gehören den folgenden Faunenelementen an:

1 mediterrane Faunenelemente
2 westasiatische Faunenelemente
3 kaspische Faunenelemente
4 zentralasiatische Faunenelemente
5 mongolisch-sibirische Faunenelemente
6 mandschurische Faunenelemente
7 pazifische Faunenelemente

	Untersuchte Gebiete (siehe Karte)																Faunen-
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	element
Sh. attrovittatus											×		×		×		7
L. atriplaga											×		×				6 (7)
H. corticalis											×		×				7
lignea															×		7
N. davidi									×		×		×	×	×		6
bipartita															×		7
leechi											×		×	×			6
S. biloba													×				7
E. lineata													×		×		6
R. cristata										×	×		×		×		6
splendida											×		×		×		7
U. albimacula													×				6
arcuata													×				6
branickii													×				6
viridimixta											×		×				6
A. plebeja											×		×				6 (7)
H. leucodera											×		×	×	×		7
E. fumosa														×	×		7
T. takamukui														×			7
Pt. capucina	a	a					b		b	b	b	b	b	b	b	b	6
robusta															×		7
jezoensis														×	×		7
hoegei											×		×	×	×		7 (?)
cucullina	×																1
saerdabensis		×	×														3 (1)
ladislai											×		×		×		6
grisea													×		×		7

	Untersuchte Gebiete (siehe Karte)																Faunen-
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	element
L. cuculus													×		×		6
O. carmelita	×						×		×			×					5
patricia										×	×		×				6
sieversii	×						×			×	×		×				6
H. admirabilis											×		×		×		6
kishidai											×		×				7
T. velutina											×		×	×	×		6
J. karaganaeca					×												4
Pt. plumigera	×	×															1
nohirae													×				6
jezoensis													×				6
H. miraculosa											×		×	×			6
L. bicoloria	a, b						b	b	b	b	b	b	a, b	a	a		6
Ph. bucephala	×	×	×		×		×		×	×	×		×	×			6
bucephaloides		×															1
flavescens													×				7
assimilis													×				7
Ph. bombycina													×				6
Sp. argentina	×																1
doeriesi											×		×		×		6
dives											×		×		×		6
plusiotis											×		×				6
Pt. eugenia								×									5
E. ornata													×				7
Gl. crenata	×						×		×	×	×		×	×			6
oxiana				×													4
Rh. aussemi					×												4
P. timon	×						×		×	×	×		×				6
Cl. curtula	×	×			×		×		×	×							5
albosigma							×		×	×	×		×	×			6
pigra	×	×					×			×	×	×	×				6
obscurior						×											4
anachoreta	×			×	×	×	×		×	×	×		×		×		7
modesta					×	×											4
anastomosis	×	×					×		×	×	×	×	×	×			7
M. troglodyta											×		×				6
sieversi										×	×		×				6
flavomaculata													×				6
G. timoniorum										×	×		×	×	×		7

Tabelle 1. Verbreitung der Notodontidae in der UdSSR nach Regionen.

Literatur

Cai, R.-Qu. (1979). New Genus and new species of chinese Notodontidae (Lepidoptera). *Acta ent. sin.* 22 : 462-467 (in chinesisch).

Ebert, G. (1971). Drei neue Macrolepidoptera-Arten aus Iran. *Beitr. naturk. Forsch. SüdwDtl.* 30 : 65-71.

DANIEL, F. (1965). Das Genus *Harpyia* (= *Cerura* auct.) im palaearktischen Raum unter Einschluß der naheverwandten nordamerikanischen Formen. *Z. wien. ent. Ges.* 50 : 5-49.

DANIEL, F. (1965). Österreichische Entomologische Iran-Afghanistan-Expeditionen. Beiträge zur Lepidopterenfauna, Teil 4. *Z. wien. ent. Ges.* 50 : 122-145.

KIRIAKOFF, S. G. (1967). In Wytsman, Genera Insectorum 217b, Fam. Notodontidae – Genera Palaearctica. Kraainem, 238 pp., 8 pls.

KIRIAKOFF, S. G. (1974). Neue und wenig bekannte asiatische Notodontidae (Lepidoptera). *Veröff. Zool. Staatssmlg. München* 17 : 371-421.

KUMAKOV, A. P. & YU. P. KORSHUNOV (1979). Die Schmetterlinge des Gebietes Saratov. Verlag der Universität Saratov, 80 pp. (in russ.).

LATTIN, G. DE (1967). Grundriß der Zoogeographie. Fischer, Jena, 602 pp.

LATTIN, G. DE, M. BECKER & R. U. ROESLER (1974). Zwei neue Subspecies aus dem Cerura vinula-Kreis (Lepidoptera : Notodontidae). Frankf. a. M. 84 : 85-93.

SCHINTLMEISTER, A. (1981). Drei neue Unterarten von Notodontidae aus dem Kaukasus. (Lepidoptera, Notodontidae). *Entomofauna* 2 : 33-49.

SCHINTLMEISTER, A. (1982). Verzeichnis der Notodontidae Europas und einiger angrenzender Gebiete. *Nota lepid.* 5 (4) : 194-206.

SCHINTLMEISTER, A. (1984). Zum Status einiger fernöstlicher Taxa. Notodontiden-Studien I. *Zeitschr. Arbeitsgem. Öster. Ent.* 35 (1983) : 106-112.

SCHINTLMEISTER, A. & A. V. SVIRIDOVI (1985). A New Species of Notodontid Moth from the Far East, a Vicariant of *Dicranura ulmi* (Lepidoptera, Notondontidae). *Vestnik Zoologi* 1985 : 58-61 (in russ.).

SCHINTLMEISTER, A. & YU. A. TSHISTJAKOV (1984). Zur Kenntnis von *Micromelalopha* NAGANO, 1916 im Fernen Osten (Lepidoptera, Notodontidae). *Entomofauna* 5 : 80-100.

STSHETKIN, YU. L. (1979). Eine neue *Pheosia* aus Tadshikistan. *Zool. shurnal* 58 (12) : 1891-1893 (in russ.).

STSHETKIN, YU L. (1980). Eine neue Art und eine neue Gattung eines Zahnspinners (Lep. Notodontidae) aus Tadshikistan. *Ent. Obozr.* 59 : 59 : 161-165 (in russ.).

TSHISTJAKOV, YU. A. (1979). Die Notodontiden Südprimoryes. *In* : Nazem tshlenistonogie Dalnego Vostoka, Vladiwostock : 32-56 (in russ.).

TSHISTJAKOV, YU. A. (1985). Vorläufige Ergebnisse von Untersuchungen zur Zahnspinnerfauna des Fernen Ostens der UdSSR. *In* : Taksonomija u ekologija dalnego Vostocka, Vladivostock : 53-66 (in russ.).

VARGA, Z. (1977). Das Prinzip der areal-analytischen Methode in der Zoogeographie und die Faunenelemente-Einteilung der europäischen Tagschmetterlinge (Lepidoptera : Diurna). *Acta Biol. Debrecina* 14 : 223-285.

VIIDALEPP, J. (1979). Zur Schmetterlingsfauna der Tuvinischen ASSR II. *Tartu Riikliku Ülikooki Toimetised* 483 : 17-39 (in russ.).

WITT, T. J. (1981). *Rhegmatophila aussemi* sp. n. (Lepidoptera Notodontidae). *Entomofauna* 2 : 81-92.

Communication

Wir suchen

Für vergleichend systematische Untersuchungen Zuchtmaterial (Eier, lebende ♀♀ und ♂♂) aus der Gattung *Erebia.*

Appel

Pour des recherches comparatives systématiques, nous cherchons matériel d'élevage (œufs, ♀♀ et ♂♂ vivants) du genre *Erebia.*

Research

For comparative systematic investigations we need rearing materal (eggs, living ♀♀ and ♂♂) of the genus *Erebia.*

Dr. Peter Roos, Alte Poststrasse 83, D-4322 Sprockhövel 1, BRD.
Wilfried Arnscheidt, Hüllerstrasse 49, D-4630 Bochum 6, BRD.

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Biography of Prof. Esko Suomalainen, Honorary member of SEL

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Prof. Esko SUOMALAINEN has had a long career as a lepidopterist. Born in 1910 in Helsinki, he began his diary on Lepidoptera in 1926 at his summer residence, Porvoo, 40 km E.N.E. of Helsinki. Now, over 60 years later, he is ready to publish the lepidopterous fauna of Porvoo. From the archipelago of the same area he published an article about an insect migration in the year 1935 and about the lepidopterous fauna in 1979. His first publication, which he wrote at the age of 19, deals with the fauna of Lapland, and his most recent paper on northern Lepidoptera, the important separation of *Xestia laetabilis* and *X. distensa*, was published in 1983. He has revised the Finnish "*Solenobia*" species, and his most recent interest deals with the chromosomal evolution of the South American Heliconiine and Ithomiine butterflies.

Throughout his scientific career, Prof. SUOMALAINEN was a geneticist. He dealt mainly with the parthenogenesis of beetles and other insects, and with the polymorphism and chromosomes of Lepidoptera. He completed his Ph.D degree (on Curculionids) in the year 1940 at the University of Helsinki. Here he was lecturer in genetics (1941-1948), professor of genetics 1948-1976, and head of the department of genetics (1949-1976). He also undertook research work at the Kaiser Wilhelm-Institut for Biology, Berlin-Dahlem, in 1942-1943 and lectured at the University of Lund in 1952. Prof. SUOMALAINEN has always been praised by his students as an excellent lecturer and teacher. Despite his retirement, he continues to be active in research work.

Prof. SUOMALAINEN was the first president of the Finnish Lepidopterological Society from 1955 to 1979. During this period, the number of members of the society grew from 32 to over 500, the society obtained an official subsidy and it began to publish its own journal "Baptria" (named after the Geometrid *Baptria tibiale*, the subspecies *fennica* of which is the emblem of the society).

Prof. Esko SUOMALAINEN is a cultured person. He was vice-president of the Finnish National Commission for UNESCO 1957-1965, and president in 1965. Besides lepidopterological research, and his beautiful personal collection, his hobbies include paintings, ethnographic objects and chinese porcelain. In addition, he is a well-known photographer and published with his brother in 1938 a book about the beauty of Finnish nature. Prof. SUOMALAINEN is one of the rare people who seem to be able to tell a cultural joke or story in every possible situation. It is not surprising that Prof. SUOMALAINEN is a member of several academies and honorary member of several scientific societies, that he has been presented awards, and that his friends and colleagues had a medal struck to celebrate his 75th birthday.

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Autobibliography (Lepidopterological publications)

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1. 1929. Lepidopterologische Beobachtungen während einer Reise nach Muonio und Enontekiö im Sommer 1928. – *Annal. Soc. Zool.-Bot. Fenn. Vanamo* Tom. 8, N° 7, pp. 78-104.
2. 1937. *Oeonistis quadra* L. (Lep., Arctiidae) in Tvärminne gefunden. – *Annal. Entomol. Fenn.* 3, pp. 48-49.
3. 1937. Über das periodische Auftreten von *Erebia ligea* L. (Lep., Satyridae) in Finnland. – *Annal. Entomol. Fenn.* 3, pp. 78-83.
4. 1938. Die Erblichkeitsverhältnisse des männlichen Dimorphismus bei *Parasemia plantaginis*. – *Hereditas* 24, pp. 386-390.
5. 1940. Über den täglichen Zeitpunkt des Ausschlüpfens der Imagines bei zwei Schmetterlingsarten. – *Annal. Entomol. Fenn.* 6, 110-112.
6. 1941. Vererbungsstudien an der Schmetterlingsart *Leucodonta bicoloria*. – *Hereditas* 27, pp. 313-318.
7. 1942. Esko SUOMALAINEN & Heikki SUOMALAINEN, Über das Vermögen des Schmetterlingsweibchens, Männchen fremder Arten anzulocken. – *Annal. Entomol. Fenn.* 8, pp. 103-106.
8. 1944. Zur Biologie von *Dendrolimus pini* L. (Lep., Lasiocampidae). – *Annal. Entomol. Fenn.* 10, pp. 181-183.
9. 1944. Eräitä pikkuperhoslöytöjä itä-Uudeltamaalta. (Einige Mikrolepidopterenfunde aus dem östlichen Uusimaa). – *Annal. Entomol. Fenn.* 10, p. 184.
10. 1945. *Arenostola (Calamia) phragmitidiksen* Hb. (Lep., Noctuidae) esiintymisestä Porvoon pitäjässä (U). – (Über das Auftreten von *Arenostola (Calamia) phragmitidis* Hb. (Lep., Noctuidae) im Kirchsp. Porvoo (U)). – *Annal. Entomol. Fenn.* 11, pp. 123-124.
11. 1945. J. KAISILA, Esko SUOMALAINEN & O. TUURALA, Eräitä kiintoisia pikkuperhoslöytöjä Helsingistä (U) ja sen lähiympäristöstä kesällä 1945. (Einige interessante Mikrolepidopterenfunde aus Helsinki (U) und Umgebung). – *Annal. Entomol. Fenn.* 11, pp. 206-207.

12. 1947. Zur Ausbreitung der Schmetterlinge durch die Eisenbahn. – *Annal. Entomol. Fenn.* 13, p. 182.
13. 1950. Parthenogenesis in animals. – *Adv. Genet.* 3, pp. 193-253.
14. 1950. Thorwald GRÖNBLOM & Esko SUOMALAINEN, Über das Vorkommen der Nonne, *Lymantria monacha* L. (Lep., Lymantriidae), in Finnland. – *Annal. Entomol. Fenn.* 16, pp. 178-181.
15. 1951. Perhosten pyydystämisestä elohopealampulla. [Collecting Lepidoptera with mercury vapour lamps. In Finnish.] – Luonnon Tutkija 55, pp. 147-149.
16. 1953. The kinetochore and the bivalent structure in the Lepidoptera. – *Hereditas* 39, pp. 88-96.
17. 1953. Neueres über das Vorkommen der Nonne, *Lymantria monacha* L. (Lep., Lymantriidae) in Finnland. – *Annal. Entomol. Fenn.* 19, pp. 52-56.
18. 1954. *Cidaria obstipata* F. (Lep., Geometridae) tavattu jälleen Suomessa kesällä 1953. (*Cidaria obstipata* F. (Lep., Geometridae) further finds in Finland in summer 1953). – *Annal. Entomol. Fenn.* 20, pp. 84-85.
19. 1954. Das Zentromer und die Bivalentenstruktur bei den Schmetterlingen. – *Proc. of 9th Intern. Congr. of Genetics* (Bellagio 1953), Part II, pp. 780-781.
20. 1958. Über das Vorkommen und spätere Verschwinden von *Epinephele lycaon* Rott. (Lep., Satyridae) in Finnland. – *Annal. Entomol. Fenn.* 24, pp. 168-181.
21. 1960. Perhoset, kesän tunnukset. [Butterflies and moths, signs of the summer. In Finnish.] – *Oma maa* 7, pp. 18-31.
22. 1961. *Nycteola asiatica* Krul. (Lep., Noctuidae) in Finland, the first record for Northern Europe. – *Annal. Entomol. Fenn.* 27, pp. 139-141.
23. 1962. Thorwald GRÖNBLOM, Ilkka JALAS, Jouko KAISILA, Harry KROGERUS & Esko SUOMALAINEN, Catalogus Lepidopterorum Fenniae et regionum adiacentium. I. Macrolepidoptera. – Helsinki, 28 pp.
24. 1963. On the chromosomes of the Geometrid moths *Cidaria*. – *Proc. of XI Intern. Congr. of Genetics* (The Hague 1963), Vol. I, pp. 137-138.
25. 1965. On the chromosomes of the Geometrid moth genus *Cidaria*. – *Chromosoma* 16, pp. 166-184.
26. 1967. Esko SUOMALAINEN & Kauri MIKKOLA, *Nycteola asiatica* KRUL. (Lep., Noctuidae) as a migrant in Northern Europe. – *Annal. Entomol. Fenn.* 33, pp. 102-107.
27. 1969. Chromosome evolution in the Lepidoptera. – *Chromosomes Today* 2, pp. 132-138.

28. 1969. On the sex chromosome trivalent in some Lepidoptera females. — *Chromosoma* 28, pp. 298-308.
29. 1970. Über die *Solenobia*-Arten Finnlands (Lep., Psychidae). — *Annal. Entomol. Fenn.* 36, pp. 139-142.
30. 1971. Unequal sex chromosomes in a moth, *Lozotaenia forsterana* F. (Lepidoptera : Tortricidae) — *Hereditas* 68, pp. 313-315.
31. 1972. Esko SUOMALAINEN, Laurence M. COOK & John R. G. TURNER, Chromosome numbers of Heliconiine butterflies from Trinidad, West Indies (Lepidoptera, Nymphalidae). — *Zoologica* (New York) 56, pp. 121-124.
32. 1973. Esko SUOMALAINEN, Laurence M. COOK & John R. G. TURNER, Achiasmatic oogenesis in the Heliconiine butterflies. — *Hereditas* 74, pp. 302-304.
33. 1975. Juhani LOKKI, Esko SUOMALAINEN, Anssi SAURA & Pekka LANKINEN, Genetic polymorphism and evolution in parthenogenetic animals. II. Diploid and polyploid *Solenobia triquetrella* (Lepidoptera : Psychidae). — *Genetics* 79, pp. 513-525.
34. 1975. Marja SORSA & Esko SUOMALAINEN, Electron microscopy of chromatin elimination in *Cidaria* (Lepidoptera). — *Hereditas* 80, pp. 35-40.
35. 1976. *Cochylis hybridella* Hb. tavattu Suomessa. [*Cochylis hybridella* Hb. found in Finland. In Finnish.] — *Baptria* 1, p. 58.
36. 1977. Kolme Suomelle uutta pikkuperhoslajia (Lepidoptera). (Three species of microlepidopterous moths new to Finland.) — *Notul. Entomol.* 57, pp. 21-23.
37. 1978. Two new cases of parthenogenesis in moths. — *Nota Lepid.* 1, pp. 65-68.
38. 1978. Juhani LOKKI, Kalevi K. MALMSTRÖM & Esko SUOMALAINEN, Migration of *Vanessa cardui* and *Plutella xylostella* (Lepidoptera) to Spitzbergen in the summer 1978. — *Notul. Entomol.* 58, pp. 121-123.
39. 1979. The lepidopteran fauna of an isolated island in the outermost archipelago of the Gulf of Finland. — *Notul. Entomol.* 59, pp. 79-88.
40. 1979. Perhosten kromosomaalinen evoluutio. (The chromosomal evolution of Lepidoptera.) — *Luonnon Tutkija* 83, pp. 87-91.
41. 1980. Esko SUOMALAINEN, Jouko KAISILA & Kauri MIKKOLA, Noteworthy records of Finnish Lepidoptera 1955-1974. I. Hesperioidea, Papilionoidea, Bombycoidea and Geometroidea. — *Notul. Entomol.* 60, pp. 49-61.
42. 1980. The Solenobiinae species of Finland (Lepidoptera : Psychidae) with a description of a new species. — *Entomol. Scand.* 11, pp. 458-466.

43. 1981. Esko SUOMALAINEN, Juhani LOKKI & Anssi SAURA, Genetic polymorphism and evolution in parthenogenetic animals. X. *Solenobia* species (Lepidoptera : Psychidae). — *Hereditas* 95, pp. 31-35.
44. 1983. Perhosten aberraatioista. [Colour aberrations in butterflies and moths. In Finnish.]. — *Baptria* 8, pp. 7-8.
45. 1983. *Xestia (Anomogyna) laetabilis* (ZETTERSTEDT) and *X. distensa* (EVERSMANN) (Lepidoptera, Noctuidae) : two species confused. — *Notul. Entomol.* 63, pp. 115-123.
46. 1983. Rauno VÄISÄNEN, Esko SUOMALAINEN & Harri LOUMA, The occurrence and protection of *Lycaena dispar* (Lepidoptera, Lycaenidae) in Finland. — *Notul. Entomol.* 63, pp. 124-126.
47. 1984. *Xestia (Anomogyna) laetabilis*-nimellä on kulkenut kaksi eri yökköslajia, nimittäin *X. laetabilis* ja *X. distensa.* [*Xestia (Anomogyna) laetabilis,* a dual species, *X. laetabilis* and *X. distensa.* In Finnish.] — *Baptria* 9, pp. 5-10.
48. 1984. Esko SUOMALAINEN & Keith S. BROWN, Jr, Chromosome number variation within *Philaethria* butterflies (Lepidoptera : Nymphalidae, Heliconiini). — *Chromosoma* 90, pp. 170-176.
49. 1985. *Microstega hyalinalis* (Hb.) (Lepidoptera, Pyraloidea), a moth species probably extinct in Finland. — *Notul. Entomol.* 65, pp. 123-126.
50. 1986. *Lycia hanoviensis* (HEYMONS, 1891), perhoslaji, joka voisi mahdollisesti löytyä Suomesta. [*Lycia hanoviensis,* a species which could occur in Finland. In Finnish.] — *Baptria* 11, pp. 1-2.
51. 1987. Esko SUOMALAINEN, Anssi SAURA & Juhani LOKKI, Cytology and evolution in parthenogenesis. — CRC-Press, Florida, U.S.A. About 250 pp.

In addition to the publications mentioned above, about 150 publications in genetics, cytology and zoology.

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Eine neu entdeckte Lymantriiden-Art aus Kaschmir : *Arctornis kohistana* sp. n. (Lepidoptera, Lymantriidae)

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Abstract

A new Lymantriid-moth, *Arctornis kohistana* sp. n., has been found in a rich Cashmere material collected in 1977 by the author. This species differs from *Arctornis l-nigrum* (MÜLLER, 1764) in external appearance (discal vein-pattern) and in both sexes' genital morphology. *Arctornis kohistana* sp. n. occurs in the lower ranges of the Western Himalaya.

Die sukzessive Bearbeitung des vom Verfasser im Jahre 1977 im Hindus-Kohistan (Kaschmir) eingetragenen Insektenmaterials erbringt den Nachweis einer für die Wissenschaft neuen Art der Gattung *Arctornis* GERMAR, 1810.

Diese, *Arctornis kohistana* sp. n., ist in niedrigen bis mittleren Lagen der kaschmirischen Region verbreitet. Mit in Indien und Pakistan beheimateten indoaustralischen Arten wie *Arctornis comma* (HUTTON, 1865) oder *A. submarginata* (WALKER, 1855) ist sie nicht mittelbar verwandt. Vielmehr scheint sie *A.l-nigrum* (MÜLLER, 1764) als deren nächste Verwandte im westhimalajanischen Raum zu vertreten. Der Lebensraum von *A.l-nigrum* endet im vorderasiatischen Bereich im Iran, wohin die Art, von Europa ausgehend, über das nördliche Kleinasien bis in das Elburs-Gebirge und das kaspische Gebiet vordringt (Nachweis : 1 ♀ Elburz, bei Chalus, Nashta Rud, 28 m, 6.8.1972, leg. CZIPKA, in Museum WITT).

Arctornis kohistana sp. n.

Material :

Holotypus ♂ (Abb. 1) : Pakistan, SW-Himalaya, Indus-Kohistan, Kaghan-Tal, Shinu, 1700-2200 m, 14.-23.6.1977, leg. DE FREINA.

Paratypen : 2 ♂♂ (Abb. 3) 1 ♀ (Allotypus, Abb. 2), wie Holotypus. 1 ♂ (Abb. 4) : W-Pakistan, Swat, Kalam, 2000 m, 9.7.1969, leg. G. EBERT. (Alle Tiere in Museum Witt, München).

Diagnose :

Spannweite Holotypus 40 mm, Paratypen ♂♂ 39-42 mm, Allotypus ♀ 48 mm.

Arctornis kohistana sp. n. unterscheidet sich sowohl habituell als auch genitalmorphologisch von *A. l-nigrum.*

Habituell ist der arttypisch entwickelte diskoidale schwarze Winkelmakel im Vorderflügel das auffallendste Merkmal der neuen Art. Im Gegensatz zu *l-nigrum* zeigt dieser zwei deutlich ausgeprägte, im 90°-Winkel zueinanderstehende längere Schenkel. Beide Schenkel sind gleich kräftig ausgebildet (vgl. Abb. 1-4). Dagegen tritt bei *l-nigrum* nur der waagrechte Schenkel deutlich in Erscheinung, der senkrechte ist dagegen nur andeutungsweise vorhanden (siehe Abb. 5-8). Auffallend ist auch die gröbere und seichtere Beschuppung der neuen Art gegenüber dem dichteren und feineren Schuppenkleid von *l-nigrum.* Äußerlich gleicht die neue Art in Grundfarbe und Gesamterscheinung ansonsten *A. l-nigrum.*

Die Genitalmorphologie zeigt allerdings gegenüber *l-nigrum* wesentliche Unterschiede in beiden Geschlechtern, die wie folgt zu diagnostizieren sind :

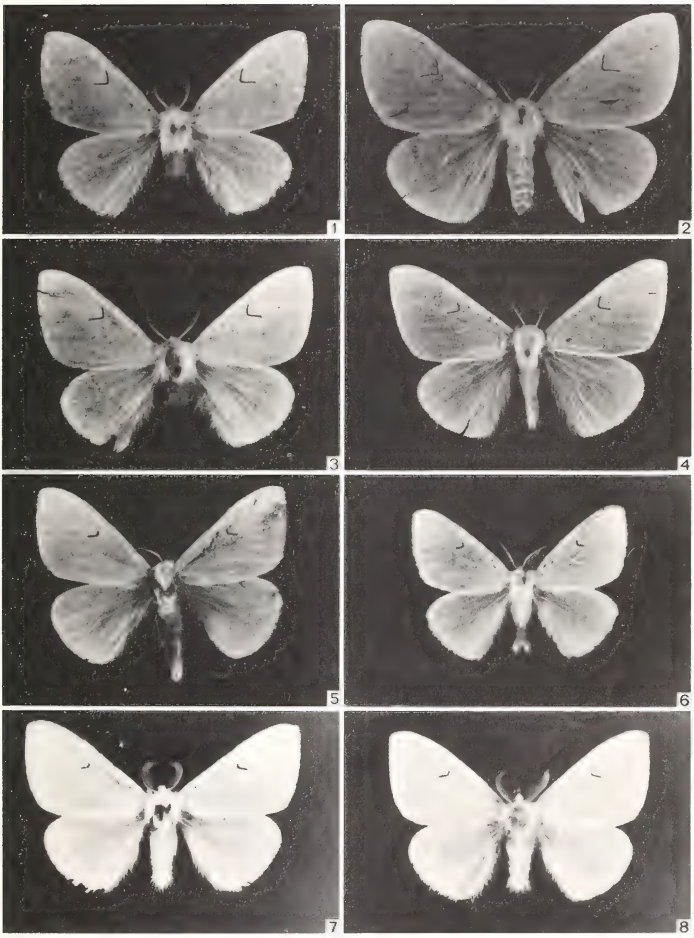
Männchen :	*kohistana sp. n.* (Abb. 11, 14)	*l-nigrum* (Abb. 9/10, 12/13)
a) Uncus	Kurz, gedrungen, kugelförmig.	Wesentlich länger, an der Spitze v-förmig eingedellt, kräftiger.
b) Tegumendach	Die Anteile des 9. bzw. 10. Abdominalsegments sind noch zu keiner Einheit	Das Tegumendach bildet eine Einheit. Die Grundform ist weniger wuchtig.

→

Abb. 1-8. – *Arctornis kohistana* sp. n. und *Arctornis l-nigrum* MÜLLER.

1. *Arctornis kohistana* sp. n., Holotypus ♂. Pakistan, SW-Himalaya, Indus-Kohistan, Kaghan-Tal, Shinu, 1700-2200 m, 14.-23.6.1977, leg. DE FREINA (Gen. Präp. Museum Witt 2854).
2. *Arctornis kohistana* sp. n., Para (Allo)typus ♀. (Gen. Präp. Museum Witt 2963). Wie Abb. 1.
3. *Arctornis kohistana* sp. n., Paratypus ♂. (Gen. Präp. Museum Witt 2855). Wie Abb. 1 und 2.
4. *Arctornis kohistana* sp. n., Paratypus ♂. W-Pakistan, Swat, Kalam, 2000 m, 9.7.1969, leg. G. EBERT.
5. *Arctornis l-nigrum* (MÜLL.) ♂. UdSSR, Nordkaukasus, Maikop, Dorf Nikel, 1.7.1978, leg. A. N. POLTAWSKI.
6. *Arctornis l-nigrum* (MÜLL.) ♂. Jugoslawien, Mazedonien, Skopje, 250 m, 29.7.-2.8.1974, leg. B. AUSSEM.
7. *Arctornis l-nigrum* (MÜLL.) ♂. Italia centr. mer., Le Mainarde-Gruppe, Mte. la Meta-Gebiet, 700 m, 23.6.1958, leg. H. und L. WIEGEL.
8. *Arctornis l-nigrum* (MÜLL.) ♂. Südbayern, Deining bei Wolfratshausen, A.7.1957, leg. KOCH/PAVLAS.

(Alle Tiere in Museum Witt, München).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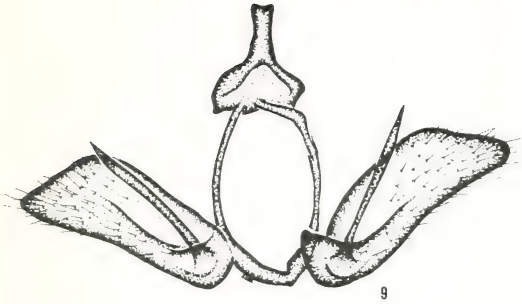
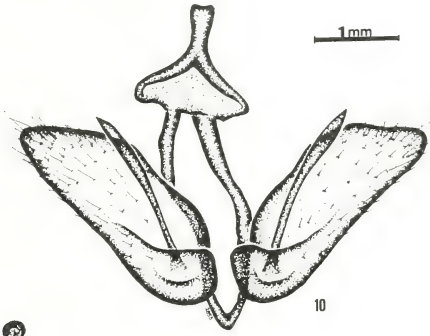
	verschmolzen, das äußere Tegumenteil ist breit ausladend und von rundlicher Form.	
c) Valven	Gleichmäßig, eher ellipsenförmig, Processus schlank. Am Übergang zum Vinculum schlank auslaufend, beidseitig gefaltet. Die linke Valve ist etwas schlanker und spitzer. Der Clasper erreicht annährend die Länge der Valve.	Deutlich breiter, die rechte Valve mit leichter Eindellung, Spitze gerundeter. Am Übergang zum Vinculum ist sie kolbenartig verdickt, lediglich an der Außenseite gefaltet. Clasper merklich kürzer als die Valve.
d) Penis	Schlanker, an der Oberkante kräftig sklerotisiert. Durch den bis zur Spitze durchgezogenen Wulst zeigt der Fortsatz löfffelartige Form.	Massiver, gedrungener gebaut, jedoch weit weniger sklerotisiert. Fortsatz wegen der nur kurzen Wulst nasenartig. Dieser Nasenfortsatz ist deutlich länger und massiver als bei *kohistana* sp. n.
Weibchen :	*kohistana sp. n.* (Abb. 15)	*l-nigrum* (Abb. 16)
a) Grundbauplan	Wie *l-nigrum*	
b) Signum	Das Verhältnis Länge zu Breite beträgt ca. 5 :1. Das Signum ist also deutlich kürzer als bei *l-nigrum*, dafür ist es zu einem Ende hin stark verbreitert bzw. abrupt zu einer Spitze verjüngt. Bedornung fein, alle Spitzen weisen ausschließlich in eine Richtung.	Das Verhältnis Länge zu Breite beträgt 8 :1, also bei gleichbleibender Stärke deutlich länger und schlanker als bei *kohistana* sp. n. Bedornung etwas gröber. Auffallend ist die Stellung der Dornen, die alle zur Signum-Mitte zeigen, so daß die Richtung der Bedornung einer Hälfte gegen die der anderen Signumhälfte verläuft.

Zur genitalmorphologischen Untersuchung wurden folgende Exemplare herangezogen :

Arctornis l-nigrum (MÜLL) :

1 ♂ Styria m., Sausal-Gebirge, Kitzeck, 300-500 m, E.VI.1959, leg. F. DANIEL (Gen. Präp. 2852).
1 ♂ dito, jedoch 10.6.1958 (Gen. Präp. 2853).





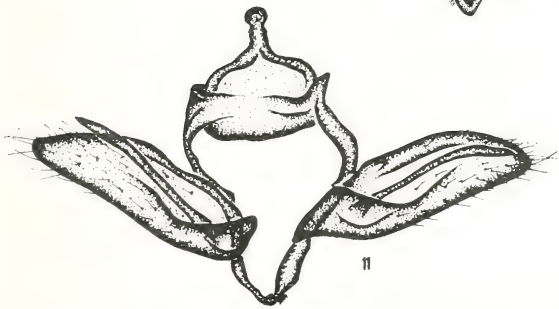
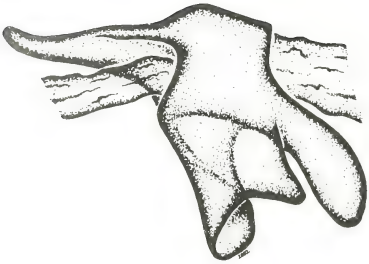


Abb. 9-11. – Männliche Genitalien von *A.l-nigrum* (MÜLL.) und *A. kohistana* sp. n., ventrocaudale Ansicht bei seitlich ausgebreiteten Valven und entferntem Penis.

9. *Arctornis l-nigrum* (MÜLL.): Austria, Styria m., Sausal-Gebirge, Kitzeck (Gen. Präp. Museum Witt 2852).
10. dito (Gen. Präp. Museum Witt 2853).
11. *Arctornis kohistana* sp. n., Holotypus (Gen. Präp. Museum Witt 2854).



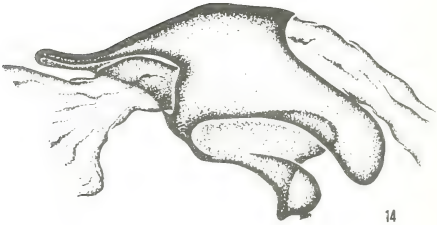


Abb. 12-14. – Penis von *A.l-nigrum* (MÜLL.) und *A. kohistana* sp. n.
12. *Arctornis l-nigrum* (MÜLL.), wie Abb. 9.
13. *Arctornis l-nigrum* (MÜLL.), wie Abb. 10.
14. *Arctornis kohistana* sp. n., wie Abb. 11.

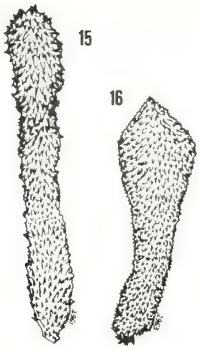


Abb. 15-16. – Signum des ♀-Genitalapparates (Vergrößerung wie Abb. 12-14).
15. *A.l-nigrum* (MÜLL.).
16. *A. kohistana* sp. n.

1 ♀ Italien, Vinschgau, Naturns, 600 m, 20.7.-1.8.1970, leg. B. AUSSEM (Gen. Präp. 2961).
1 ♀ Trento, Loppio-See, 220 m, 16.-22.6.1961, leg. DANIEL (Gen. Präp. 2962).

Arctornis l-nigrum ussuricum BYTINSKI-SALZ, 1939 :

1 ♂ Japan, Shibecha, Kushiro, 10.VIII.1956, coll. K. IJIMA (Gen. Präp. 2856).

Arctornis kohistana sp. n. :

1 ♂ Pakistan, SW-Himalaja, Indus-Kohistan, Kaghan-Tal, Shinu, 1700-2200 m, 14.-23.6.1977, leg. DE FREINA (Holotypus) (Gen. Präp. 2854).
1 ♂ dito (Paratypus) (Gen. Präp. 2855).
1 ♀ dito (Allotypus) (Gen. Präp. 2963).
(Alle Tiere in Museum Witt, München).

Allgemein kann über die Genitalstruktur der zwei verglichenen Arten gesagt werden, daß sich zumindest bei den ♂♂ beider Arten nach bisherigen Untersuchungen keine Plastizität zeigt.

Alle untersuchten *l-nigrum*-Individuen der Westpalaearktis lassen keine Variabilität erkennen. Lediglich das Präparat Nr. 2856 eines Tieres aus Japan zeigt geringfügige Unterschiede zu den Präparaten europäischer Individuen,

was auf die Berechtigung des Taxon im Unterart-Rang, *ussuricum* BYTINSKI-SALZ, 1939, hinweist, unter dem die in Ostasien und Japan beheimateten *l-nigrum*-Populationen zusammengefaßt sind.

Die Genitalmorphologie bei *kohistana* sp. n. ist ebenso konstant, so daß wegen der deutlichen Unterschiede zu *l-nigrum* kaum Zweifel am Artrecht von *kohistana* sp. n. aufkommen können.

Die engere Heimat von *A. kohistana* sp. n. ist der tropisch immergrüne Bergwald Kaschmirs. Ihr Lebensraum, den man klimatisch noch zum warm gemäßigten Bereich der subtropischen Zone rechnen muß, ist geprägt von feuchtwarmen, schwach monsunbeeinflußten Sommern und winterlich kühler Trockenzeit bei selten auftretendem strengerem Frost. Der Baumbestand dieser Region setzt sich in der Regel aus hochwüchsigem Mischwald mit dichtem Buschwald als Unterwuchs zusammen. *Arctornis kohistana* sp. n. scheint im Gegensatz zu den meisten Arten dieser Region kein tropisches Faunenelement. Vielmehr dürfte es sich um eine himalajanisch-chinesisch verbreitete Art handeln, deren Vorkommen auch in Ostafghanistan nicht auszuschliessen ist.

Literatur

BRYK, F. 1934. Pars 62: Lymantriidae. In STRAND, E. (ed.), Lepidopterorum Catalogus. – W. Junk, Berlin.

FREINA, J. J. DE & T. J. WITT. 1987. Die Bombyces und Sphinges der Westpalaearktis, Bd. 1. – Edition Forschung und Wissenschaft, München.

HAMPSON, G. F. 1892. The Fauna of British India, including Ceylon and Burma. – Taylor and Francis, London.

INOUE, H., SUGI, S. *et al.* 1982. Moths of Japan, Vol. 1 und 2. – Kodansha Co. Ltd., Tokyo.

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On the family-level systematics of the Pterophoridae

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Pending the revision of the Pterophoridae for the "Monographs of the Polish Fauna" series, I have drawn the following conclusions regarding the systematics of the Pterophoridae at the family level based on the assessment of certain morphological characters.

Past works encompassing the systematics of the Pterophoridae were accurately summarized by Yano (1963), who began with the work of Tutt (1907) and finished with the revised edition of Beirne (1954). Yano proposed the subdivision of the Pterophoridae into 3 subfamilies, i.e. Agdistinae, Platyptiliinae and Pterophorinae, thereby essentially following Spuler (1910). In addition to the external characters of the adult utilised by earlier authors, Yano took some larval and pupal features into account. Wasserthal (1970) erected a fourth subfamily, the Ochyroticinae, and proposed that the Agdistinae and Platyptiliinae constitute the sister group to the Pterophorinae and Ochyroticinae (fig. 1). This was based mainly on the

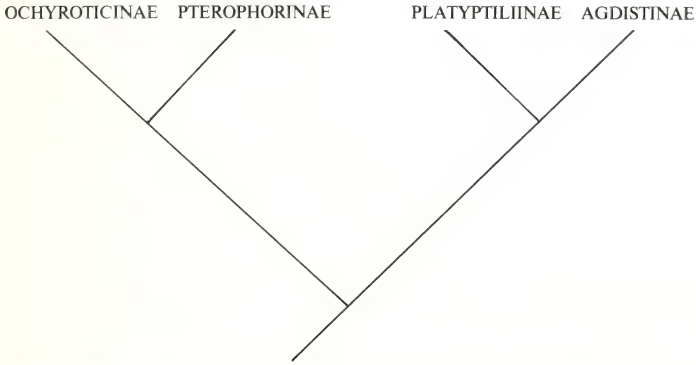

Fig. 1. Dendrogram of the subfamily-level taxa of the Pterophoridae (Wasserthal, 1970).

fact that pore DbI in the first instar larva was absent in the former group. In 1974, WASSERTHAL presented data on the folding of the wings and the venation which confirmed the close affinity between the subfamilies within the two sister groups. In the Ochyroticinae and Pterophorinae, the hind edge of the fold of the hindwing does not reach vein CuP, while in the Agdistinae and Platyptiliinae it runs along that vein. HANNEMANN (1979) summarized this data. Then KUZNETSOV and STEKOLNIKOV (1979) noticed that in the Platyptiliinae the protractor of the aedeagus (m5) is attached to the tegumen, while in the Pterophorinae it is attached to the vinculum. They interpreted this difference as being due to a secondary change of the position caused by a reduction of the vinculum as observed in all Pyraloidea, in which they placed the Pterophoridae.

In addition to these facts, I realised that muscle m5 in the Agdistinae is attached as in the Platyptiliinae and that some minor genital characters may correspond with that arrangement. Unfortunately, I have had no chance to examine any representative of the Ochyroticinae. So, basically, the arrangement proposed by WASSERTHAL, i.e. the splitting of 4 subfamilies into 2 sister groups, is accepted. However, due to a different assessment of the characters, I propose a rearrangement of the subfamilies within the sister groups (fig. 2). First, the reduction of pore DbI is insufficient to support the main division of the family as supposed originally. Its absence is treated (cf. also HANNEMANN, 1977) as an autapomorphy, despite HANNEMANN himself mentioning that the character is common to all Ditrysia. As all reductions, it is of limited value. A convergent specialisation of the wings appeared in the two sister

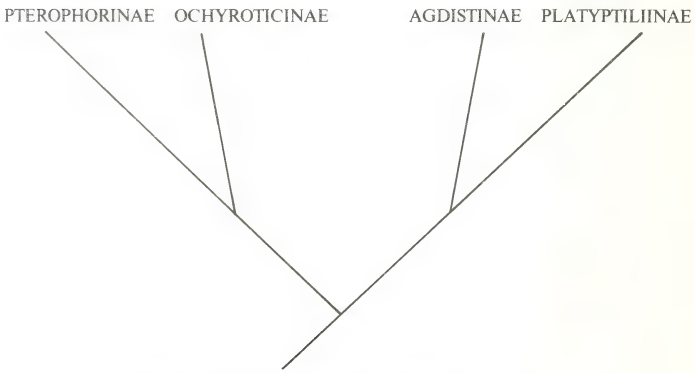

Fig. 2. Proposed new arrangement of the subfamilies of the Pterophoridae.

groups, from normally developed, to divided into "plumes". However, the method of folding the wings differed, which lead to a different venation. In the Ochyroticinae + Pterophorinae, the hind margin of the fold of the hindwing does not reach vein CuP which terminates at the tip of the third plume. This character can be regarded either as a plesiomorphy or autapomorphy equivalent to the presence of a single vein (An) in the third plume of the Agdistinae + Platyptiliinae. The attachment of the protractor of the aedeagus on the vinculum is certainly of plesiomorphic importance. Further plesiomorphies are a non-specialised structure of the male subgenital sternite, the presence of the pore DbI and the occurrence of a setal pattern which corresponds to that of the hypothetical Ditrysian type reconstructed by HASENFUSS (1963). The latter character, as already realised by WASSERTHAL (1970), directly depends on the life history of the larva and is thus of little importance.

The sister group Agdistinae + Platyptiliinae exhibits the following autapomorphies : the hind edge of the hindwing fold extends along vein CuP ; in the third plume of the hindwing only vein An is preserved, while vein CuP is strongly reduced, reaching the base of the cleft between the two posterior plumes ; the specialised, long, apically concave subgenital sternite of the male ; the attachment of the protractor of the aedeagus inside the tegumen. In addition, and due to a process of reduction, pore DbI is absent from the prothorax of the larva.

In the first group, the more derived subfamily is the Pterophorinae, as the wings are subdivided into plumes, with a simplified venation. Other characters are difficult to compare, as the Ochyroticinae are insufficiently known.

In the second group, the Agdistinae are more generalised than the Platyptiliinae, as they have non-divided wings and complete venation ; the male subgenital sternite is rather simple. The probable autapomorphies of the Platyptiliinae are the structure of the uncus and its junction with the tegumen, the presence of the outer sclerites at the base of the subgenital sternite in the male and the occurrence of the club-shaped process at the base of the valva dorsally. The Platyptiliinae developed plumate wings similar to the Pterophorinae, but they have different venation and another mode of folding the wings. The hindwing veins M_3, Cu_1 and Cu_2 are stalked and M_3 reaches the tip of the plume.

The probable autapomorphies of the Platyptiliinae, apart from the abovementioned plumate wings, are the presence of a single vein (An) in the hindwing and the presence of a strong ventral process of the aedeagus that functionally replaces the caulis. The strong development of the dorsal lobe or a pair of lobes of the tegumen may also be of apomorphic importance.

References

BEIRNE, B. P., 1954. British Pyralid and Plume Moths. New colour plates edition, London.

HANNEMANN, H. J., 1977. Kleinschmetterlinge oder Microlepidoptera III. Federmotten (Pterophoridae), Gespinstmotten (Yponomeutidae), Echte Motten (Tineidae). Die Tierwelt Deutschlands. 63. Teil, Jena.

HASENFUSS, I., 1963. Eine vergleichend-morphologische Analyse der regulären Borstenmuster der Lepidopterenlarven. *Z. Morph. Tiere* 52 : 197-364.

KUZNETSOV, V. I., STEKOLNIKOV, A. A., 1979. Funkcionalnaia morfologia genitalii samcov ognievkoobraznykh tcheshuekrylikh (Lepidoptera, Pyraloidea) palearktitcheskoi fauny. *Trudy Zool. Inst. Leningr.* 83 : 46-96.

SPULER, A., 1910. Die Schmetterlinge Europas. Stuttgart, Band 2.

TUTT, J. W., 1907. A natural history of the British Lepidoptera, a textbook for students and collectors. London, Berlin, Vol. 5.

WASSERTHAL, L., 1970. Generalisierende und metrische Analyse des primären Borstenmusters der Pterophoriden-Raupen (Lepidoptera), Eilarven als Objekte systematischer Untersuchung. *Z. Morph. Tiere* 68 : 177-254.

WASSERTHAL, L., 1974. Funktion und Entwicklung der Flügel der Federmotten (Lepidoptera, Pterophoridae). *Z. Morph. Tiere* 77 : 127-155.

YANO, K., 1963. Taxonomic and biological studies of Pterophoridae of Japan (Lepidoptera). *Pacif. Insects,* Honolulu 5 (1) : 65-209.

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A note on the haploid chromosome number of *Brenthis ino* ROTTEMBURG, 1775 from Finland (Lepidoptera, Nymphalidae)

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Summary

The haploid chromosome number, 13, was ascertained in male *Brenthis ino* from Porvoo, Finland, whereas in Japanese specimens an *n*, 14-karyotype was characteristic.

The lesser marbled fritillary, *Brenthis ino*, has a wide area of distribution from Europe to Japan. Previously, germ-line chromosomes of Finnish specimens were examined by FEDERLEY (1938) and the haploid chromosome numbers of 12 and 13 were recorded for their males and those of 13 and 14 for their females. In contrast, males of both *B. ino mashuensis* and *B. i. tigroides* occurring in Japan were uniform in having fourteen haploid chromosomes (MAEKI 1961 ; SAITOH *et al.*, unpublished). From a standpoint of cytotaxonomy, necessity inevitably arises to determine the exact haploid number of the Finnish specimens. Recently, through the courtesy of Prof. Esko SUOMALAINEN of the Department of Genetics in the University of Helsinki, I have had the opportunity to re-examine spermatocyte chromosomes of *B. ino* from southern Finland and some findings obtained are outlined below.

Testes of five adults, caught at Porvoo in the summer of 1984, were fixed by Prof. SUOMALAINEN with Allen's P.F.A.-3 mixture and those of five other adults with Carnoy (6 : 3 : 1), respectively. Testis-sections (8 μm) were prepared by the ordinary paraffin method. Slides of the P.F.A.-3-fixed testes were stained with Heidenhain's iron-haematoxylin and those of the Carnoy-fixed ones by the Feulgen method.

Metaphase plates suitable for the determination of the haploid chromosome number were found in two of the former testes, as well as in two of the latter ones. Counts were made in a total of 64 metaphase spermatocytes from these four : 44 (MI ; 36, MII ; 8) from the former two and 20 (MI ; 16, MII ; 4) from the latter two.

Thirteen chromosomes of the dot-shape in haploid conditions were consistently observed in each of them (figs. 1 and 2). In view of these results, it was concluded that the haploid chromosome number in the Porvoo males was 13.

Figs. 1 and 2. Bivalent chromosomes (*n*, 13) of male *Brenthis ino* from Porvoo, Finland. Haematoxylin-stained. Each metaphase is from different primary spermatocyte. Bottom bar represents about 5 μm.

On the contrary, as stated above, an *n*, 14-karyotype was characteristic of the two subspecies of Japan. This difference in the haploid chromosome number might be an indication of a complicated cytogenetic nature of this species. Therefore, a further chromosomal inquiry is necessary of its various geographic populations.

In closing this short note, I must express my thanks to Professor Esko SUOMALAINEN for his kind aid in securing the testis-materials of Finnish specimens.

References

FEDERLEY, H. 1938. Chromosomenzahlen finnländischer Lepidopteren. I. Rhopalocera. *Hereditas*, 24 : 397-464.

MAEKI, K. 1961. A study of chromosomes in thirty-five species of the Japanese Nymphalidae (Lepidoptera-Rhopalocera). *Jpn. J. Genet.*, 36 : 137-146. (In Japanese with English résumé).

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Book reviews — Buchbesprechungen — Analyses

COLLINS, N. M. & MORRIS, M. G. 1985. Threatened Swallowtail butterflies of the World. The IUCN Red Data Book. — IUCN, Gland (Switzerland) and Cambridge (U.K.). — (VII) + 401 pp., 8 col. plates. — ISBN 288032-603-6.

Papilioniden sind — wir wissen es alle — die unter Sammlern und Amateuren beliebtesten, ja spektakulärsten Tagfalter, deren "Marktpreise" höchstens noch von einigen *Morpho-* und *Agrias*-Arten (bei allerdings kleinerem Interessenten-Kreis) erreicht werden. Somit ist es höchste Zeit für eine kritische Bestandesaufnahme der Weltfauna der Papilioniden und eine Analyse des Gefährdungsgrades der am meisten bedrohten Arten. Diesem hohen Anspruch wird, das sei bereits zuvor gesagt, das vorliegende Buch in besonderem Maße gerecht.

Der Text ist in sechs Kapitel gegliedert (1. Einführung in das Buch, 2. Einführung in die Biologie der Papilioniden und mögliche Schutzmaßnahmen, 3. Nomenklatur, Verbreitung und Schutzstatus der Papilioniden der Welt, 4. Analyse bedrohter Faunen, 5. Handel, 6. Übersicht über die bedrohten Arten). Leider ist hier nicht der Platz auf alle Daten ausführlich einzugehen ; einige wichtige Fakten seien jedoch kurz hervorgehoben : Von 573 Papilioniden-Arten werden lediglich 4 als unmittelbar gefährdet angesehen : *Ornithoptera alexandrae, Papilio homerus, Papilio hospiton* und *Papilio chikae* (hinzurechnen sind noch 3 gefährdete Subspecies sonst weiter verbreiteter Arten). Weitere 57 Arten sind in der einen oder anderen Weise als bedroht, von 14 zusätzlichen Arten ist dies zu vermuten, obwohl direkte Daten bisher nicht vorliegen. 97 Arten bedürfen schließlich darüberhinaus der weiteren Überwachung um nähere Aussagen über ihren Gefährdungsstatus zu machen.

Die einzelnen Gefährdungsursachen werden sorgfältig dargestellt und auch in ihrer unterschiedlichen Bedeutung gegeneinander abgewogen (die verschiedenen Formen der Biotopveränderung und -zerstörung, der Umweltbelastung, die Einführung fremder Arten in einem gegebenen Lebensraum und schließlich — last but not least — die kommerzielle Ausbeutung). Nahezu überall sind Umweltzerstörung und -belastung als Hauptursache der Gefährdung einzelner Arten zu nennen. Kommerzielle Ausbeutung spielt vor allem in Ostasien, in Afrika und in Südamerika eine besondere Rolle. Das jährliche Handelsvolumen wird allein für Taiwan auf ca. 20-30 Million US-$ geschätzt, wobei allerdings nicht klar erkennbar ist, in welchem Ausmaß die etwa 10.000 auf der Insel tätigen Fänger einen langfristigen Effekt auf die Entwicklung einzelner Populationen haben. Der allergrößte Teil der Tiere wird für Dekorationszwecke und Souvenir-Artikel verarbeitet. In diesem Zusammenhang ist natürlich auch eine Übersichtstabelle der in den Jahren 1980-1985 vom internationalen Insektenhandel verlangten Preise für einzelne in Sammlerkreisen besonders begehrte Arten von Interesse.

Als besonders verdienstvoll und über die engere Bedeutung des Buches im Artenschutz hinausgehend, erscheint mir die detaillierte Darstellung und Zusammenfas-

sung unserer Kenntnisse der 78 bedrohten Papilioniden-Arten. Hier werden neben einer Beschreibung der einzelnen Arten jeweils Verbreitung, Lebensraum und Ökologie, die Ursachen der Bedrohung und empfohlene Schutzmaßnahmen behandelt. Zu jeder Art findet sich ein ausführliches Literaturverzeichnis, wie überhaupt die einzelnen Kapitel sorgfällig dokumentiert sind und in vieler Hinsicht eine interessante Quelle oft schwer zugänglicher Literatur darstellen.

Neben den Ornithopteren ist bisher nur noch *Parnassius apollo* weltweit durch internationale Abkommen gegen illegalen Handel geschützt. Wie gerade diese im Alpenraum und auch in Asien weit verbreitete und meist häufige Art zu dieser Ehre kommt ist unverständlich, betrachtet man den sehr viel höheren Gefährdungsgrad einzelner Feuchtbiotop-Arten unter den Tagfaltern Eurasiens oder einige stenöke und sehr viel lokaler verbreitete Lycaeniden. Andere *Parnassius*-Arten Asiens wären hier sicher sinnvoller genannt. Mit Recht führen COLLINS und MORRIS in diesem Zusammenhang auch *Parnassius autocrator* (Afghanistan, Pamir) als eine durch menschlichen Zugriff direkt gefährdete Art auf.

Dieses Buch gehört, auch wenn man in der speziellen Bewertung des Gefährdungsgrades einzelner Arten gelegentlich unterschiedlicher Meinung sein mag, in den entomologischen Bücherschrank jedes an Tagfaltern interessierten Entomologen und Naturliebhabers. Es ist eine ausgezeichnete Informationsquelle und verdient weiteste Verbreitung, schon deswegen, weil es nicht den verbreiteten Fehler der Naturschutz-Lobby macht, die Schuld am Artenrückgang ohne nähere Wertung dem sammelnden Entomologen anzulasten (auch wenn dessen Tätigkeit im Einzelfall bei lokalen, durch andere Faktoren bereits geschwächten Populationen langfristig nicht ohne Folgen bleiben wird).

C. M. Naumann

Hans-Josef WEIDEMANN : Tagfalter : Entwicklung – Lebensweise. Melsungen. Neumann-Neudamm (JNN Naturführer) Band 1. 1986, 288 Seiten, 280 Farbfotos, 26 Abbildungen, 2 Tabellen. Gebunden, mit festem Umschlag, 11,5 × 18,5 cm, DM 38,- (ISB N 3-7888-0500-5).

„Schmetterlinge sind Leben, und Leben braucht Lebensraum, um leben – weiterleben – überleben zu können" ! so umschreibt der Verfasser den Tenor seines Naturführers „Tagfalter".

Einführend (S. 10-33) werden unter den Stichworten „Lebenszyklus", „Paarung", „Einzelgänger und gesellige Arten", „Eiablage" charakteristische Züge des Falterlebens umrissen.

Ein Abschnitt „Ökologie" (S. 34-68) entfaltet an einzelnen Beispielen und unterstützt durch klare, ansprechende graphische Darstellungen die ganze Palette von Ansprüchen, die Tagfalter an ihr Habitat stellen. Im anschließenden Kapitel „Tagfalter und Vegetation" (S. 70-106) bietet der Geobotaniker WEIDEMANN einen auf das Leben der Tagfalter zugeschnittenen Abriß der Pflanzensoziologie, ergänzt durch je eine Übersichtstabelle „Pflanzenfamilien und Tagfalter" und „Lebensraumtypen der Tagfalter (als Raupe)".

Unter „Artenschutz der Schmetterlinge" (S. 106-111) faßt der Verfasser die zahlreichen im vorausgegangenen eingestreuten Hinweise in dem Satz zusammen „Der Schlüssel zu wirksamem Lepidopterenschutz liegt in der Kenntnis der Biologie und Ökologie der Arten und Berücksichtigung dieser bei Schutzmaßnahmen". WEIDEMANNS „Tagfalter" sind ein wesentlicher Beitrag zu dieser Kenntnis, insbesondere durch die Hervorhebung des wichtigen Unterschiedes zwischen den vagabundierenden oder migrierenden flugstarken r-Strategen und den standortstreuen, wenig mobilen K-Strategen unter den Tagfaltern. Zwei instruktive graphische Darstellungen veranschaulichen die Folgen, die sich aus der Änderung jahrhundertelang vollzogener Bewirtschaftungsweisen für das Weiterleben der Tagschmetterlinge ergeben und fordern konsequente Maßnahmen der Behörden, die sich nicht in der Aufstellung von Artenschutzlisten und Fangverboten erschöpfen, sondern in der Erhaltung und differenzierten Pflege gefährdeter Lebensräume gipfeln.

Der folgende systematische Teil des I. Bandes beschreibt und illustriert die Tagfalterarten Mitteleuropas (ohne Alpen) der Familien Papilionidae, Pieridae und Lycaenidae (ohne Theclinae). Einleitende Texte berichten über die Stellung der jeweiligen Gruppe „in der Schmetterlingsfauna der ganzen Erde" und erläutern „die Gemeinsamkeiten und Besonderheiten dieser Gruppe". Bei den Lycaenidae verläßt WEIDEMANN das übliche systematische Schema und gliedert nach ökologischen Gesichtspunkten (die gültige systematische Übersicht soll im 2. Bande folgen). Die Artmonographien bringen trotz ihrer Kürze eine Fülle an Information zum Verhalten, Habitat, den Nahrungspflanzen, präimaginalen Stadien und artspezifischen Anforderungen an den Lebensraum.

Ein allgemeines Register, ein Namenregister der Schmetterlinge sowie ein Register der Raupenfraßpflanzen und Pflanzengesellschaften beschließt den 1. Band ; das Literaturverzeichnis ist für den 2. Band vorgesehen.

Der Text ist insgesamt leicht verständlich geschrieben, Fachausdrücke werden erklärt.

Für den Rezensenten war es ein Genuß, die gestochen scharfen und ästhetisch wirkungsvollen Farbfotos zu betrachten, die ausschließlich lebende Objekte – von fast jeder Art Ei, Raupe, Puppe und Imago – sowie den ökologischen Teil, durch ihre Auswahl hervorragend illustrierende Biotopaufnahme darstellen. Die Druckausführung der farbigen Seiten erfüllt höchste Ansprüche und verdient uneingeschränktes Lob ; sie macht das Buch zu einem bestens geeigneten Bestimmungshelfer.

Man kann nur wünschen, daß alle, die mit Fragen des Artenschutzes befaßt sind, – die Politiker in den Ausschüssen, die Verantwortlichen in den Landschafts- und Forstbehörden aller Ebenen, vom Bund bis zum Kreis, sowie auch in den Landwirtschaftskammern und Ämtern für Agrarordnung – sich mit diesem Buch auseinandersetzen, danach entscheiden und handeln. Auch der erfahrene Lepidopterologe kann aus diesem Buch noch lernen und Anregung zur Erforschung der Ansprüche der Arten an ihren Lebensraum gewinnen. Biologielehrer sollten dieses Buch nicht unbeachtet lassen. Es bietet ihnen eine Fülle von Beispielen und Vorgaben – besonders durch die graphischen Darstellungen – für einen lebendigen und sachgerechten Ökologieunterricht.

Autor und Verlag gebührt Dank für diesen gelungenen Naturführer und den angemessenen Preis.

P. S. Wagener

FRIEDRICH, E. : Breeding Butterflies and Moths. A practical Handbook for British and European Species. Translated from German by Steven WHITEBREAD. English Edition with additional material edited by A. MAITLAND EMMET. 176 pages. Harley Books. Great Horkesley, Colchester 1986. Paperback £ 9.95, Hardback £ 20.00.

Well known and currently used by the German speaking lepidopterists in Europe, Friedrich's handbook, first published more than 10 years ago in Germany, is now available in a revised and enlarged English edition. It will certainly be greeted and appreciated by all the English speaking lepidopterists, and that for two reasons : 1. Because until now, no comprehensive work has been available in England giving adequate information to raise successfully Lepidoptera, British as well as European, from the egg to perfect imago through more than one generation. 2. Because, based on the practical experience of many expert breeders, over many years, it should permit a higher success-rate for all involved in lepidopterological husbandry : professional scientists, keen amateurs, conservationists and biology students.

This English edition has been translated from the second, revised edition of the original German work by Steven WHITEBREAD. The editor is the distinguished microlepidopterist, Lt.-Col. A. MAITLAND EMMET, who has contributed an entirely new chapter (21 pages) on his own speciality, the rearing of Microlepidoptera. Other new material includes rearing description of a majority of the British Geometrids by Jim REID, from his own considerable experience, and Brian O. C. GARDINER has written a section on artificial or semi-synthetic diets specially for the English user.

After an introduction "How to Use this Book", the work is divided into two parts. Part I (34 pages) contains a general introduction to the Fundamentals of breeding Butterflies and Moths ; Equipment and techniques ; Oviposition ; Larval Rearing ; Pupation ; and Emergence, followed by other short sections including Killing Techniques for the collector, the Breeder's Diary, Conservation and Botanical Literature.

Part II, the major part (114 pages), gives rearing descriptions of butterflies and moths covered by the work, representatives of nearly every family of Lepidoptera (around 1000 species) including "Micros". Most descriptions are divided into : mating, pairing (M) ; oviposition (O) ; rearing of larvae (L) ; overwintering (W) ; and foodplants (F). The book concludes with a comprehensive list of references to literature cited through the text ; a select bibliography of standard and popular works on British and European Lepidoptera ; a compilation of useful information and a complete index to both insects and plants.

As a real *handbook*, this work is really *practical* as mentioned in its title, and should be, when not in the hand, at least on the shelf of everyone with an interest in moths and butterflies as well as of those actively rearing lepidoptera.

E. de Bros

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Contents – Inhalt – Sommaire

E. M. LAASONEN : Obituary Jorma Kyrki (1950-1986) 138
K. MIKKOLA, J. D. LAFONTAINE & P. GROTENFELT : A revision of the holarctic *Chersotis andereggii* complex (Lepidoptera, Noctuidae) 140
R. GAEDIKE : Beitrag zur Kenntnis der paläarktischen Douglasiidae (Lepidoptera) : *Tinagma klimeschi* sp. n., aus Rhodos 158
M. LÖDL : *Noctua warrensis* sp. n., a new sibling species of *Noctua comes* HÜBNER, 1813 from Cyprus (Lepidoptera : Noctuidae) 163
K. V. N. MAES : Revisionary notes on the genus *Achyra* GUENÉE with a new synonym and the description of *Achyra takowensis* sp. n. (Lepidoptera : Pyralidae, Pyraustinae) (Studies on Pyralidae I) 175
U. RAMMERT : The defensive biology of the larvae of *Amata (= Syntomis) phegea* L. and *Amata (= Syntomis) kuhlweinii* LEF. (Lepidoptera, Ctenuchidae) 183
Book reviews – Buchbesprechungen – Analyses 193, 194, 195

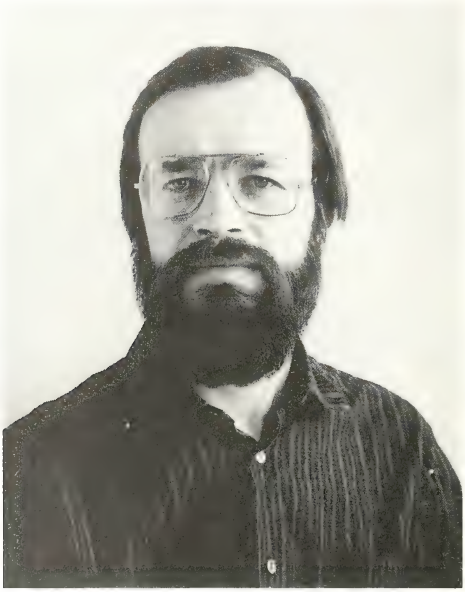
John Heath (1922-1987)

It is with deep regret that we have to report the death of John Heath on 5th July 1987. John Heath was Vice-President of the SEL from its foundation in 1976 until 1986. He will be sadly missed. A full obituary will appear in the next issue of NOTA.

Nota lepid. 10 (3) : 138-139 ; 31.X.1987 ISSN 0342-7536

Obituary
Jorma Kyrki (1950-1986) (*)

Erkki M. Laasonen



Jorma Henrik Kyrki, PhL, Vice President of the Finnish Lepidopterological Society and a member of the SEL since 1980, died suddenly on 9 November 1986 at his home in Rovaniemi, at the age of 35. The news of his untimely death was received with great sadness by us, Jorma's friends.

Jorma Kyrki was born in Turku on 2 December 1950. There he spent his childhood and schooldays. He obtained the degree of Master of Philosophical Sciences from the University of Turku. Jorma's career continued at

(*) Reprinted, with slight changes, from Notulae Entomologicae 67 (1) : 1-2, 1987.

Oulu University, from which he had already a Licentiate of Philosophy. He was putting the last touches to his thesis. All of Jorma's places of employment were connected with museums and entomology : the Natural History Collections of Tampere Museum, the Zoological Institute of Oulu University and finally the Department of Natural History, Provincial Museum of Lapland, where he held the position of department Assistant-in-Chief.

Jorma Kyrki's lepidopterological career had just begun. His main interest was the systematics of the superfamily Yponomeutoidea, with a worldwide perspective. His critical publication "The Yponomeutoidea : a reassessment of the superfamily and its suprageneric groups (Lepidoptera)" was published in Entomologica Scandinavica 15 : 71-84, 1984. This was supported by numerous additional observations and represented the basis of a thesis. Only the persistent difficulty of obtaining type material from remote countries and museums delayed the thesis. Another publication which reflects the thoroughness of Jorma's work was his "Distribution of the microlepidoptera in Finland. Fauna of the biogeographical provinces I." in Notulae Entomologicae 58 : 37-67, 1978. The first paper of this kind ever to be published in Finland, it was warmly received and resulted in a series of complementary publications concerning new finds. Jorma Kyrki and his co-workers published details of two lepidoptera new to science : *Elachista eskoi* KYRKI & KARVONEN (Ent. Scand. 15 : 521-525, 1985) and *Eudonia aequalis* SVENSSON & KYRKI (to be published in Entomologica Scandinavica). Jorma was co-author to at least fourteen papers reporting new lepidopteran species from Finland and he recently contributed to many others. Most of his papers contained unique, or at least very valuable, information on the biology of Finnish microlepidoptera. The Finnish Lepidopterological Society, especially, has suffered a severe loss : Jorma had just begun as its vice president, bringing fresh ideas for the development and enrichment of that Society. Jorma also regularly attended the SEL Congresses and he will be sadly missed by all the many friends he made at these.

In addition to all this, Jorma Kyrki was surprisingly a great music enthusiast. He played the cello and was recently heard regretting that he so seldom managed to pick up his instrument. Jorma was also an active member of the choir "Seitakuoro" in Rovaniemi.

Jorma Kyrki was known by all as a positive, industrious friend and colleague. Our feelings of loss can be voiced in this modest and inadequate manner, but none of us can fill the gap left by this eminent scientist and objective leader of the Finnish lepidopterological circle.

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A revision of the holarctic *Chersotis andereggii* complex (Lepidoptera, Noctuidae)

Kauri MIKKOLA, J. D. LAFONTAINE & Paul GROTENFELT

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Summary

In the Palaearctic region, *Chersotis andereggii* auct. has been found to include three species differing from each other mainly in male genital structures and in geographical range. *C. andereggii* (BOISDUVAL, 1834) occurs from Europe eastward to the Central Asiatic and Siberian mountains ; the isolated Baltic population differs in appearance from that of the Alps and is described as a new subspecies. *C. acutangula* (STAUDINGER, 1892) stat. n. occurs in the Central Asiatic mountains. *C. juncta* (GROTE, 1878) is widely distributed in North America (the only Nearctic *Chersotis*), and is now reported from the eastern Palaearctic, having earlier been misidentified as *C. andereggii.* Adults and male genital structures of all three species, as well as the male genitalia of *C. rectangula* (DENIS & SCHIFFERMÜLLER, 1775), are described and illustrated, and the phylogeny of the group is discussed. Lectotypes are designated for *C. andereggii, C. acutangula* and *C. exclamans* (EVERSMANN, 1841), a junior synonym of *C. andereggii. C. sjuntensis* KUZNETZOV, 1958 is possibly a distinct species near *C. rectangula,* and *C. hampsoni* (A. BANG-HAAS, 1910) comb. n. is transferred to the genus *Chersotis.*

1. Introduction

BOISDUVAL (1834) first illustrated *Agrotis andereggii,* but six years later he (1840) called it *Chersotis rectangula* var. *andereggii.* In the latter publication he also mentioned localities and gave a description : Helvetia (Switzerland) and Diniae (Digne, France), *minor, obscurior.* For more than 100 years the taxon remained as a variety of *C. rectangula* (DENIS & SCHIFFERMÜLLER, 1775) (e.g. STAUDINGER & REBEL 1901). BOURSIN (1952, 1954) showed that *andereggii* is a distinct species that can readily be distinguished from *C. rectangula* by the form of the male juxta, which is shield-shaped and flat in *C. andereggii,* but diamond-shaped with a central bulge in *C. rectangula* (fig. 2). BOURSIN (1957) noted that *acutangula* STAUDINGER, 1892 is a subspecies of *C. andereggii* and not of *C. rectangula.*

1 2 3 4

Fig. 1. From left to right : 1. *Chersotis rectangula* (D. & S.) Hungary, Josfafo 10.-15.9.1983 Z. Varga leg. ; 2. *C. andereggii* (Boisd.) U.S.S.R., SW Altai, Katanda 1200 m 26.-27.7.1983 Exp. Mikkola, Hippa & Jalava leg. ; 3. *C. juncta* (Grote) U.S.A., Oregon, Morrow Co. 1100 m 9.8.1976 T. McCabe leg. ; 4. *C. acutangula* (Stgr.) U.S.R.R., Uzbekistan, Samarkand 30.7.1892 O. Herz leg. All specimens from the Zoological Museum, University of Helsinki.

Chersotis andereggii was reported as new to the Baltic area by Petersen (1924) on the basis of one moth from the northern coast of Estonia, but at least two specimens were caught as early as at the end of the 19th century in Estonia (Petersen 1924, Sulcs & Viidalepp 1969). It was not until the 1980's that several more specimens were found in Estonia (Viidalepp oral comm.). The first record from Finland comes from the year 1960 (Lingonblad 1960). Later, five moths were taken on the southern coast of Finland (fig. 4). Thus, until the 1980's, of the isolated northern population of *C. andereggii* only a dozen specimens were known.

In the course of our ongoing studies of Holarctic Noctuidae, it became apparent that *C. andereggii* auct. in the Palaearctic region includes three sibling species. One of these, *C. juncta* (Grote, 1878), was previously thought to be restricted to the Nearctic. The third species, *C. acutangula* (Staudinger, 1892) has until now been considered as a Central Asiatic subspecies of *C. rectangula* and more recently of *C. andereggii*, though some confusion regarding its geographic distribution occurs in the literature (cf. Boursin 1948, Kovacs & Varga 1973). The northern population of *C. andereggii* has an enigmatic distribution, since it is not easily understood why a high alpine species lives in the coastal areas of the Gulf of Finland (cf. Pellmyr & Mikkola 1985).

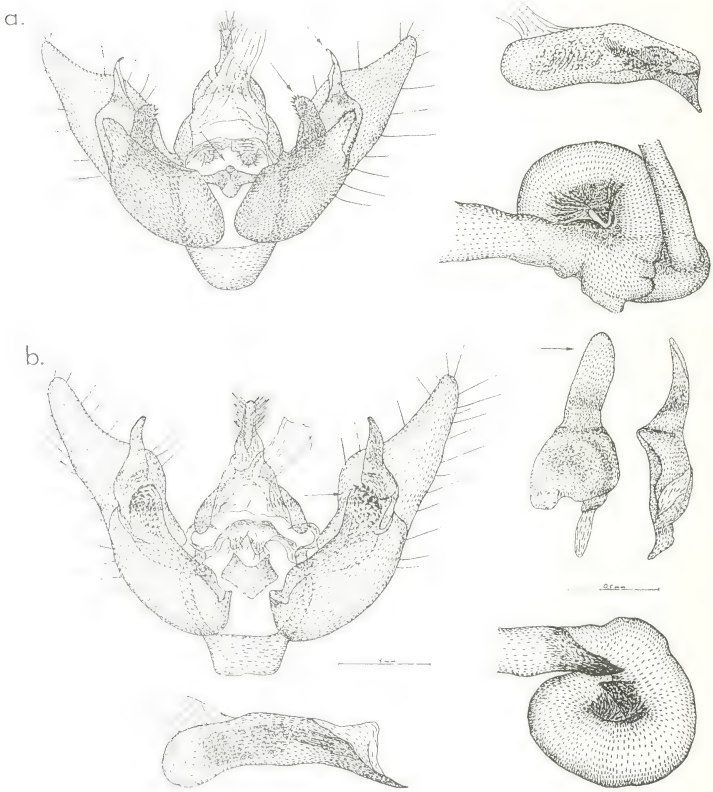
In the present paper we redescribe all these taxa, describe the new subspecies from the Baltic area and discuss the phylogeny and zoogeography of these taxa.

2. General description of the *Chersotis andereggii* complex

Appearance. Relatively small noctuids with uniformly dark greyish brown (*C.andereggii* and *juncta*) or grey-brown (*C. acutangula*) forewing. Reni-

form. orbicular and claviform spots large, outlined by a contrasting creamy white line. Lower portions of reniform and orbicular fused together ; upper portions of these spots usually separated by a black bar. Antemedian line with black wedge at base of claviform spot ; antemedian and postmedian lines with black spots at costa. Hindwing brown-grey, darker towards outer margin. Prothoracic collar black. Antenna filiform in both sexes.

Male genitalia (fig. 2). Valva broad basally, tapering apically, weakly sclerotized except sacculus. Harpe long extending well beyond costal margin of



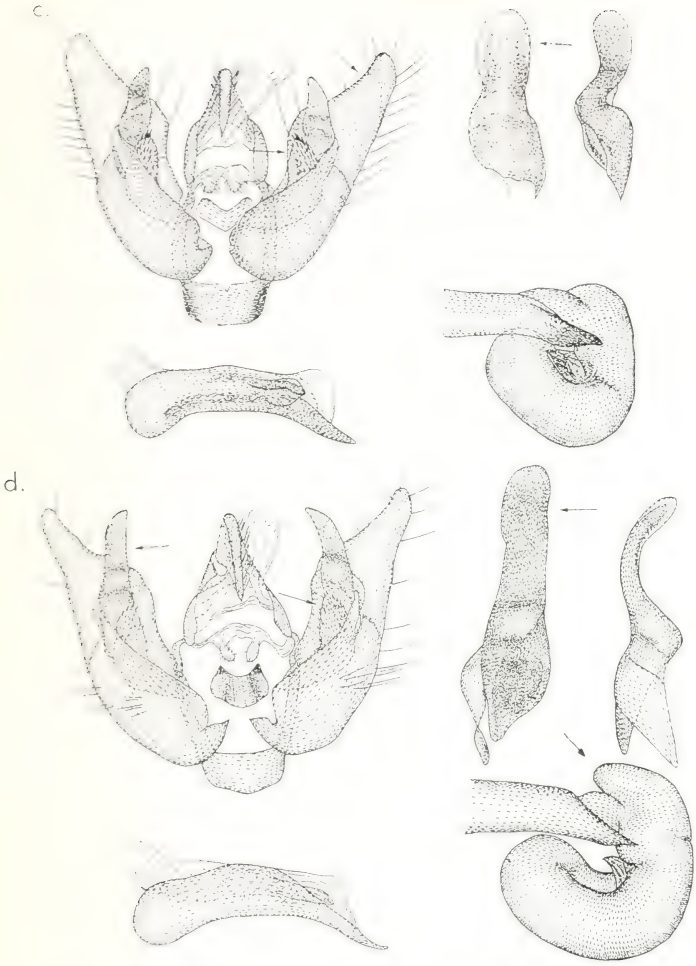


Fig. 2. Male genitalia of a. *Chersotis rectangula* Austria, Wien Prep. PG 318/1 (Mus. Paris) ; b. *C. andereggii* ssp. *arcana* ssp. n. Finland, Helsinki 18.-22.7.1968 Prep. PG 317/3 Paratype (Coll. JALAS) ; c. *C. juncta* U.S.S.R., Kamtshatka Prep. PG 317a/1 (Riksmuseet, Stockholm) ; d. *C. acutangula* U.S.S.R., Alai Prep. PG 317/c/1 Lectotype (Coll. Staudinger, Mus. Berlin). For *C. andereggii* complex (figs. 2b, c & d) : to the left opened valvae and aedeagus, and to the right harpe with double magnification shown from two directions and the everted vesica.

valva, strongly sclerotized and more or less spoon-like apically. Processus inferior (sensu BOURSIN 1954 : 254) strongly sclerotized, bent at an angle of nearly 90°, with apical and posterior portions covered with spines. Juxta shield-like, broadly V-shaped. Saccus strap-like, well sclerotized. Aedeagus with large and strongly sclerotized apical spine, slightly asymmetrical on right side. Everted vesica angled first ventrally posterior to apex of aedeagus, then coiled on the right through a total of 360° to project posteriorly. A sclerotized conical diverticulum near base of vesica pointing anteriorly. A large pouch at basal angle of vesica in one species and a slight extension only in others.

Female genitalia (fig. 3). Papillae anales with long setae laterally. Ostium bursae with large triangular plate, slightly asymmetrical to left (corresponding to spined tip of aedeagus). Ductus bursae with unsclerotized, folded pouch dorsally (corresponding to basal angle or pouch of vesica). A second pouch of ductus is sclerotized (corresponding to conical sclerotization of vesica). Appendix bursae coiled (corresponding to coil of vesica), with ductus seminalis at apex. Corpus bursae long and sac-like.

3. Key to male genitalia

1. Juxta diamond-shaped with distinct central bulge ; apex of harpe thin (fig. 2a) ..... *C. rectangula* (DENIS & SCHIFFERMÜLLER, 1775)
- Juxta flat, broadly V-shaped, shield-like ; harpe apically flattened and more or less spoon-like 2
2. Everted male vesica with dorsal diverticulum at base ; harpe long, projecting dorsally beyond valve for about one half of its length (fig. 2d) ..... *C. acutangula* (STAUDINGER, 1892) **stat. n.**
- Vesica without dorsal diverticulum ; harpe shorter, only apical third extending beyond costal margin of valva 3
3. Apical half of harpe tapering towards tip ; processus inferior apically broadly rounded, spines at the tip project at nearly right angle to axis of extension (fig. 2b) ..... *C. andereggii* (BOISDUVAL, 1834)
- Apical part of harpe broad, spoon-like, asymmetric ; processus inferior tapering towards tip, spines at tip project nearly in the same direction as extension (fig. 2c) ..... *C. juncta* (GROTE, 1878)

4. Species of the *C. andereggii* complex

Chersotis andereggii (BOISDUVAL)
Figs. 1, 2, 3 and 5

Agrotis andereggi BOISDUVAL, 1834 : plate 76, fig. 6. Type locality : Valais, Switzerland.

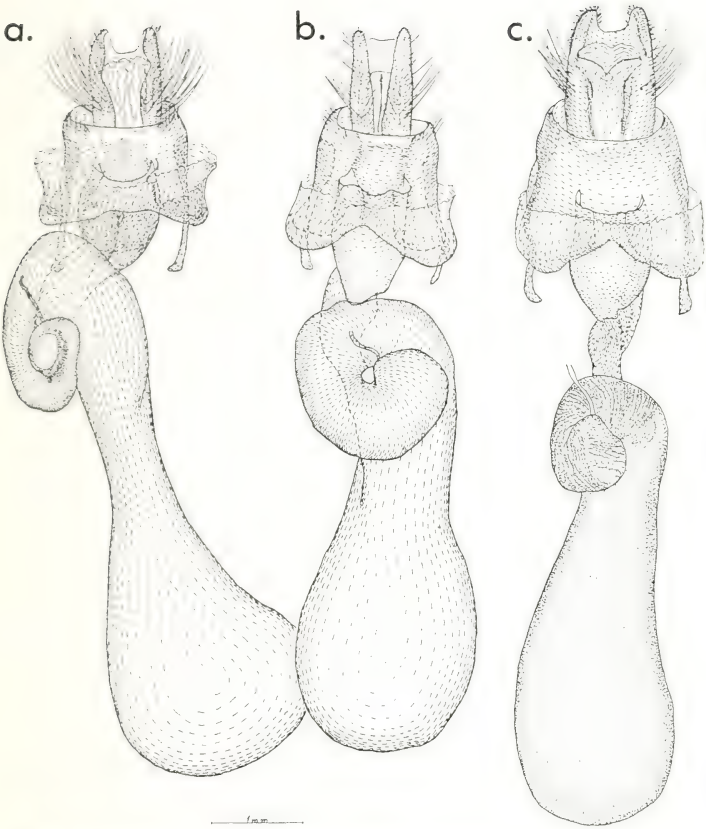


Fig. 3. Female genitalia of a. *Chersotis andereggii* ssp. *arcana* ssp. n. Finland, Helsinki 29.7.1963 Prep. PG 317/1 Paratype (Coll. MIKKOLA) ; b. *C. juncta* U.S.S.R., Kamchatka Prep. PG 317a/2 (Riksmuseet, Stockholm) ; c. *C. acutangula* U.S.S.R., Alai Prep. PG 317c/3 Paralectotype (Coll. STAUDINGER, Mus. Berlin).

Agrotis rectangula var. *anderreggii* (sic) ; BOISDUVAL 1840 : 103, no. 765.
Agrotis anderreggii (sic) ; GUENÉE 1852 : no. 519.
Rhyacia rectangula var. *andereggii* ; STAUDINGER & REBEL 1901 : 142, no. 1229 a.
Agrotis rectangula var. *andereggii* ; CORTI 1929 : 1.
Chersotis andereggii ; BOURSIN 1948 : 131.
Agrotis exclamans EVERSMANN, 1841 : 27, Figs. 5 and 6. Type locality : South-western Ural mountains. Synonymized by GUENÉE 1852.

Description. Forewing particularly unicolorous, dark greyish brown. Transverse lines inconspicuous, except black patch on antemedian line near base of claviform spot. Creamy lining of maculation thin and relatively inconspicuous.

Male genitalia. Shape of male valva quite variable but relatively long and tapered in most specimens. Harpe not especially broad at apex, apical half slightly tapered, processus inferior apically broadly rounded, covered by spines, most of them pointing in direction of extension, but larger apical ones bent at nearly right angle to point medially. Juxta relatively long ("high" in a slide), about as long as wide.

Female genitalia. As described for species complex.

Type material. In the CORTI collection of Naturhistorisches Museum Basel, a male syntype with the following labels was found : "e coll. GUENÉE", "Ex Musaeo Ach. GUENÉE" and a big folded label, evidently written by GUENÉE, beginning : "*Anderreggii* (sic) Bd. Bdv. ic. pl. 76 — Gn. Spec. 619. 1-2. Valais (ANDEREGG.) — 3-4. Basses alpes ? (M. DONZEL). Malgr' ..." (see below). This male is here designated as LECTOTYPE.

The type material of *A. exclamans* was studied in ZIN, Leningrad, and the male labelled "Coll. EVERSMANN/SPASK/Prep. PG 317" is here designated as LECTOTYPE.

Distribution (fig. 4). Occurs in several disjunct areas, at least in Europe with boreo-alpine distribution. It is known from the Pyrenees through the Alps to Austria and Italy, mainly at elevations of 1500 to 2500 m, and from the Baltic area (see below). To the east it occurs from the southern Ural mountains and Turkey eastward to Transcaucasia, Turkestan (up to 4500 m) and Central Asia (Kaputdzuh in Azerbaidzan ; Issykkul ; Tianschan ; Pontus), southern Siberian mountains, mainly at elevations of 500 to 1500 m (Altai ; Sayan ; the Baikal area) and several localities in Mongolia where it was found at elevations of 1150 to 1650 m (STAUDINGER 1892, KOVACS & VARGA 1973, see below under *C. acutangula*, FORSTER & WOHLFAHRT 1971, CALLE 1982).

Fig. 4. Schematized distribution map of the species of the *Chersotis andereggii* complex. Black. no. 1 to 1 = populations of *C. andereggii*, 2 = *C. a. andereggii*, 3 = *C. andereggii arcana* ssp. n. and 4 to 4 = *C. juncta*; striped = *C. acutangula*.

Habitat. In most part of its range the species occurs on alpine meadows and steppe slopes ; in the Baltic area it seems to fly on relatively open and dry habitats of coastal areas, possibly also in open sunny pine forests.

Remarks. In the folded label of the lectotype (see above), the writer discusses the systematic position of "*anderreggii*" as follows (translated from French by E. DE BROS) : "In spite of the opinion of most modern authors I persist not only to believe it as distinct from *rectangula* but even to consider it as not belonging to the same group. It is somehow a neighbour of *recussa* and the author (i.e. BOISDUVAL) makes a transition to *polygona*, however the last point must be discussed. But I cannot change my opinion about the validity of the species". The label must have been written by GUENÉE, because the

contents, the handwriting and the taxonomic opinion do not fit BOISDUVAL. The same hand is visible in the labels of the type of *Noctua chardinyi* (BOISDUVAL). Both specimens probably changed hands from BOISDUVAL to GUENÉE, from him to OBERTHÜR and finally to CORTI.

The label reveals that ANDEREGG collected the species in Valais. At the time of writing of the label, four specimens existed, but it is possible that at the time of description of the species, BOISDUVAL only had those from Valais. As GUENÉE adds a question mark after Basses Alpes (Digne sec. BOISDUVAL 1840), we believe that the present specimen is from Valais.

Chersotis juncta (GROTE)
Figs. 1, 2 and 3

Agrotis juncta GROTE, 1878 : 170. Type locality : Nova Scotia.
Agrotis patefacta SMITH, 1895 : 333. Type locality : Calgary, Alberta. Synonymized by SMITH, 1907 : 147.
Chersotis rectangula ssp. *andereggii* ; CORTI, 1929 nec BOISDUVAL, 1834 (Kamchatka).
Chersotis rectangula ssp. *acutangula* ; BOURSIN, 1948 nec STAUDINGER, 1892 (Kamchatka).
Chersotis andereggii ; SEDYKH, 1979 nec BOISDUVAL, 1834 (Kamchatka).

Description. Forewing ground-color darker and still more unicolorous than in *C. andereggii*, blackish brown ; creamy lining of maculation usually more conspicuous, especially that of larger claviform spot.

Male genitalia. Valva apically shorter and more roundish than in other species of complex. Apical third of processus inferior tapering towards apex, spines at tip of it project nearly along axis of process. Harpe short as in *C. andereggii*, but apically broad and with obliquely cut tip. Juxta shallower than in preceding species, belt-like, saccus also shallower, strap-like.

Female genitalia. As in *C. andereggii*, but with fewer setae on papillae anales.

Type material. The holotype in British Museum (Nat. Hist.), London, was studied by SMITH, 1907, and he synonymized his own *Agrotis patefacta* with *A. juncta*. Topotypical specimens are present in the Canadian National Collection, Ottawa. Lectotype of *A. patefacta* in USNM, Washington, designated by TODD 1982, was studied by JDL and KM.

Distribution (fig. 4). Occurs across Canada from Newfoundland and Nova Scotia westward to the Yukon and Alaska, and southward in the east to southern Quebec and northern Michigan and in the western mountains to northeastern Arizona and south-central California (FORBES 1954, ROCKBURNE & LAFONTAINE 1976). In the Palaearctic region it occurs at least in

Kamchatka and in Magadanskaya oblast' (CORTI 1929, SEDYKH 1979, KONONENKO oral comm.).

Habitat. Dry open conifer forests, in the south also alpine meadows.

Remarks. The species is now reported for the first time from the Palaearctic. CORTI (1929) identified specimens from Kamchatka (in Naturhistoriska Riksmuseet, Stockholm), as *Agrotis rectangula* var. *andereggii*, but BOURSIN (1948) "corrected" this as ssp. *acutangula*. This is surprising since *acutangula* is the most variegated taxon of the complex while *C. juncta* is the most unicoloured. Identification of specimens from Mongolia as *C. andereggii acutangula* by KOVACS & VARGA (1973) is also based on BOURSINS view, since he had seen the material in an early phase of the work (VARGA, oral comm.). They represent *C. andereggii* sensu stricto, however (VARGA in litt.).

We fully agree with SMITH (1907) on the synonymization of his *Agrotis patefacta* with GROTE's *A. juncta*, even if the former was represented as a subspecies of the latter by FRANCLEMONT & TODD (1983). Though some eastern specimens are darker than most western ones, the variation is widely overlapping and corresponds in general to the more mesic collecting localities in the east.

Chersotis acutangula (STAUDINGER, 1892) **stat. n.**
Figs. 1, 2 and 3.

Agrotis rectangula var. *acutangula* STAUDINGER, 1892 : 355.
Chersotis andereggii ssp. *acutangula* ; BOURSIN, 1948 : 131.

Description. Largest, palest and most contrastingly marked taxon of complex, forewing grey-brown with well-defined black transverse lines.

Male genitalia. Valva prominently tapering apically as in *C. andereggii* but distal part longer and narrower. Harpe longer than that of other species in complex, apically spoon-like, processus inferior apically slightly tapering, its apical spines project mediodorsally being intermediate between the other two taxa. Juxta broad and shallow as in *C. juncta*, but its posterior margin is arch-like and posterior tips are sharper and more strongly sclerotized. Everted vesica dorsally with a prominent basal dorso-posterior diverticulum which is absent in other taxa (fig. 2d).

Female genitalia. As described for complex ; however, slides were not available for detailed study of ductus bursae (expected to show deeper posterior pouch than in other species).

Type material. The STAUDINGER collection (in Naturkundemuseum Berlin) contains the following syntypes : Alai 1 ♂ 1 ♀, Margelan 2 ♂♂ (probably mountains 30 km S of village), Samarkand 1 ♂ and Usgent 1 ♂. The male

Fig. 5. Top row : *Chersotis andereggii arcana* ssp. n., from left to right : Helsinki 1968, Borgå lk. 1977, Hitis 1960 (holotype) and Helsinki 1963 (cf. Chapter Type material). Two lower rows : *C. a. andereggii* from the Alps (Mus. Paris), first from left to right 4 males : Larche, Basses Alpes ; Tyrol ; La Bessée, Hautes Alpes ; Colmars, Basses Alpes, and then 3 females and one male : Névache ; Davos, Graubünden ; Zermatt, Penniner Alps 2 specs.

from Alai, Fig. 2d (♂ genitalia) in this article and Pl. 6 : Fig. 21 in O. BANG-HAAS (1922), is hereby designated as LECTOTYPE.

Disribution (fig. 4). Central Asia : Tianschan, Alai, Transalai, Kungei-Alatau, Gissarskiy range, Peter I range, Tarbagatai, Pamir (Samarkand, Fergana, Usgent, Margelan, Sarawschan). Elevations of 2000-3000 m.

Habitat. Dry, steppe-like mountain slopes sparsely covered with *Juniperus* trees (VARGA in litt.).

5. Subspecies of *C. andereggii*

Chersotis andereggii ssp. ***arcana*** MIKKOLA ssp. n.
Fig. 2, 3 and 5.

Description. Wingspan (measuring accuracy 0.5 mm) : Males, mean = 31.75 mm (n = 2, range 31.5-32.0) ; females, mean = 30.7 mm (n = 5, S.D. = 0.86, range = 29.5-31.5). Smaller (but see below) and darker than *C. andereggii* ssp. *andereggii* (BOISDUVAL), and with more unicolorous forewing (fig. 5). Forewing groundcolour dark greyish brown ; maculation and lines correspond to those of *C. a. andereggii*, but are weaker : e.g. hind part of antemedian line usually just darker hint (black in *C. a. andereggii*), postmedian line hardly ever filled with light colour and creamy line around maculation in most cases quite inconspicuous. Hindwing characteristic : outer third, or more, suffused with colour nearly as dark as forewing (in *C. a. andereggii* hindwing is whitish with slightly darker colour near margin and particularly at veins).

Male genitalia (fig. 2b). Identical with specimens from the Alps.

Female genitalia (fig. 3a). Identical with specimens from the Alps.

Type material. Holotype ♀ : "Fennia, Ab : Hitis 25.7.1960 LINGONBLAD leg." (Mus. Zool. Helsinki). Paratypes : Finland : 1 ♂ "Fennia, Helsinki, Vallisaari 18.-22.7.1968 Ilkka JALAS leg. ; prep. ♂ 317/3 P. Grotenfelt" (Coll. JALAS) ; 1 ♀ "Suomi, N Helsinki, Merikatu 29.7.1963 H. MIKKOLA leg. ; prep. ♀ 317/4 P. GROTENFELT" (Coll. MIKKOLA) ; 1 ♀ "Fennia, N : Borga lk., Illby 6706 : 432 3.-9.8.1977 M. LANDTMAN leg." (Coll. LANDTMAN) ; 1 ♂ U : Helsinki, Isosaari 666 : 39 16.-28.7.1982 E. & L. LAASONEN leg. (Coll. LAASONEN) ; 1 ♂ U : Vantaa 668 : 39 14.-20.7.1983, J. WETTENHOVI & P. KOSKINEN leg. Estonia : 1 ♀ "Narva 82 Merekvel, Coll. FILIPJEV" (ZIN, Leningrad) ; 1 ♂ "Coll. FILIPJEV" (ZIN, Leningrad ; from outer appearance of the moth and from collecting areas of FILIPJEV this was interpreted to be the second specimen mentioned by PETERSEN 1924) ; 1 ♀ Tiitsoo 30.7.1905 E (sic) PETERSEN leg., studied from the good photograph presented by SULCS

& VIIDALEPP (1969). All the Finnish moths have been collected at light, but that from Tiitsoo, Estonia, with baits.

Etymology. Lat. fem. *arcana* = secret, mysterious ; from the puzzling rarity and locality of the taxon.

Remarks : An analysis of the diagnostic characters. 2 ♂♂, 5 ♀♀ from the Baltic area were compared with 11 ♂♂, 3 ♀♀ from the Alps. Characters expected to be typical of the Baltic moths were taken as minus : 1. Wing span at most 32.0 mm, 2. darkness of forewing grade 4 (scale : 1 = light brown, 2 = light medium brown, 3 = dark medium brown, 4 = dark brown), 3. orbicular spot without sharp border line, maculation of same colour with wing (not distinctly greyish), 4. postmedian line not sharply defined or filled with light colour, 5. hind part of antemedian line not visible or just faint stripe, 6. subterminal line obscure or mere borderline between darker and lighter colour and 7. outer part of hindwing distinctly dark, also between the veins (alternative : dark only near margin, veins darker than groundcolour).

The wing span did not differ in males from the Baltic area (mean = 31.75 (31.5 + 32.0) and from the Alps (31.7 ± 1.52, n = 11). However, there was a significant difference in the females : 30.7 ± 0.86, n = 5 and 34.0 ± 1.00, n = 3, respectively ($t = 5.03$, $df = 6$, $p < 0.005$). Darkness of hindwing was the most distinctive single character in both sexes : the hindwings of the lightest moth from the Baltic area (from Tiitsoo) were similar to the darkest from the Alps (fig. 5, bottom row, second from right). The mean value of the Baltic moths was - 4.00 ± 1.82, but that of the moths from the Alps + 4.42 ± 1.60. When all the characters are taken into account, not a single specimen can be mistaken to originate in a wrong area : the minimum value for the Baltic area was - 2.00 (2 moths) but + 2.00 (3 moths) for the Alps.

The six moths available from the southern Ural mountains had similar hindwing to that in the Alps, but the forewing was more unicolorous, yet more variegated than in the Baltic area. This appearance may be common for the whole of Siberia and would warrant, when more material is available, description of an additional subspecies.

Discussion

Phylogenetic relationships of taxa. Our reconstructed phylogeny of the species in the *C. andereggii* complex is shown in fig. 6. Two other closely related complexes are included for out-group comparison : the *C. rectangula* (DENIS & SCHIFFERMÜLLER, 1775) complex (also including *C. sjuntensis* KUZNETZOV, 1958) and the *C. ocellina* (DENIS & SCHIFFERMÜLLER, 1775) complex (also including *C. transiens* (STAUDINGER, 1896) and *C. alpestris*

(BOISDUVAL, 1832) ; *C. oreina* DUFAY, 1984, bona species, not available). Other species studied were *Chersotis hampsoni* (A. BANG-HAAS, 1910 : 34) **n. comb.**, *C. cuprea* (Denis & Schiffermüller, 1775) and *C. multangula* (HÜBNER, 1803).

C. sjuntensis was described on the basis of one female from Turkmenistan, Sjunt. We are afraid that KUZNETZOV (1958) compared these genitalia to those of *C. andereggii* and not to those of *C. rectangula*, because both were called "*rectangula*" by KOZHANCHIKOV (1937). In the type series of *C. acutangula* (Naturkundemuseum Berlin) there is an unknown *Chersotis* male from Zeitun, Central Asia, which is close to *C. rectangula*, but seems to differ from this in the coiling of vesica. We assume that this is the undescribed male of *C. sjuntensis*, but we refrain from describing it because of lack of exact knowledge about the association of the male with the described female.

The *C. rectangula* and *C. andereggii* complexes are linked together by three synapomorphies. 1. The pyramid-like right-hand basal sclerotization of vesica seems to be a synapomorphy unique to these complexes. 2. All species

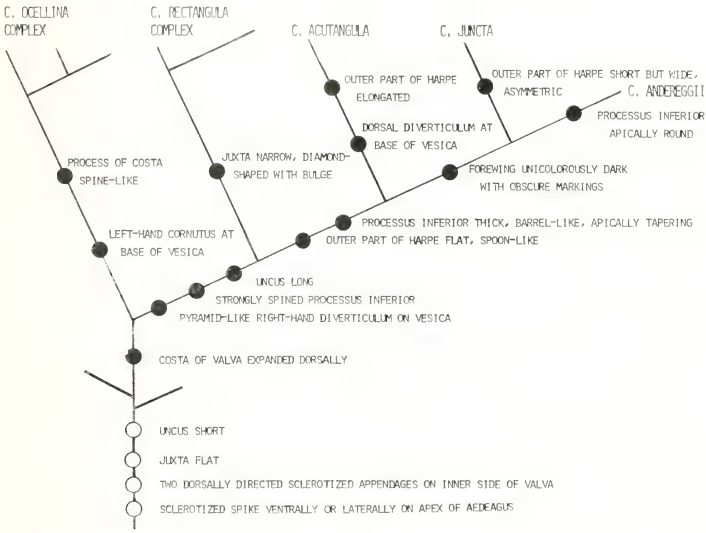


Fig. 6. A provisional cladogram for the *C. andereggii* complex and two closely related groups. The open sympols denote some generic characters of *Chersotis*, the filled ones are apomorphies of the present complexes.

have a broad, unsclerotized costal lobe in the dorsal margin of valva. In the same position, the species of the *C. ocellina* complex have a quite different sharp and sclerotized costal process. 3. The strong spiny armour of processus inferior is typical of these species. Of other species sudied, only *C. hampsoni* has spines on the processus, but they are weak.

The structure of the juxta and processus inferior as well as the coiling of the vesica link the species of the *C. andereggii* complex together. The relationship of these species to each other is not easily understood, the solution being mainly dependent on the interpretation of the polarity of the character states of basal diverticulum of vesica (present/absent). The basal diverticulum is present, though not in exactly similar form, in the *C. rectangula* complex and in *C. multangula*, but as it is absent in most species, it must be an apomorphic condition. The diverticulum of *C. acutangula* would then be an autapomorphy without significance in the cladistic analysis. The polarity of the character states of the processus inferior and harpe can hardly be determined. We therefore tentatively group *C. andereggii* and *C. juncta* on the basis on their similar general appearance. They would be sister species and east/west counterparts. This similarity is contrasted by the larger size, and paler colour and better defined maculation of the forewing in *C. acutangula.* The harpe with the distal part clearly longer than the basal part is probably also an autapomorphy of this species (about 2/3 of the basal part in the two other species).

The *C. andereggii* complex might have originated in the Central Asian mountains where *C. acutangula* now lives. The recent *C. andereggii* may have spread only secondarily in that area. As *C. juncta* is the only *Chersotis* species in North America and as it does not show any subspecific variation, we suggest that it has a Beringian origin and has only relatively recently acquired its wide distribution in North America.

Zoogeography of *C. angereggii arcana.* 7000-8000 years ago a dry climate favourable for *C. anderggii* prevailed in Europe (see WARNECKE 1953, HOLDHAUS 1954). Later the forests again spread over vast areas and the area of distribution of the species was split into parts. The case of *C. andereggii arcana* shows us that a period of about 7000 years and equally many generations have been enough for a change of appearance but not enough for a change in the genitalia. The relative difference in the size of females points towards a considerable ecological specialization during this time span.

Alternatively, the isolation is older : *C. a. andereggii* would have overwintered the Ice Ages in the southern Central European mountains and *C. andereggii arcana* would have spread to the Baltic area from the east. Then *C. andereggii arcana* would be more closely related to the populations of the southern Ural mountains than to those of the Alps. The uniform forewing

colouration speaks for this ; size measurements of females relative to males could give an answer to this.

To the east and south-east the nearest record is about 2000 km away (Orenburg). The species certainly does not live in the areas between, because it has not been mentioned in the respective faunas (Leningrad area : DERZHAVETZ *et al.* 1986 ; Pskov region : POSPELOV *et al.*, 1979 ; White-Russia : MERZEYEVSKAYA 1971 ; Moscow-Kaluga area : SIROTIN unpubl. ; Kirov : CHERNIN 1974 ; Komi : SEDYKH unpubl.). To the south the closest occurrences of the species are about 1600 km away.

A few other xerophilic/montane lepidopterans have more or less isolated occurrences along the coasts of the Baltic Sea (see NORDSTRÖM *et al.*, 1969) : e.g. *Athetis lepigone* (MÖSCHL.), *Rhyacia grisescens* (FABR.), *Standfussiana lucernea* (L.) and *Eupithecia pernotata* (GUENÉE). The general distribution of the last mentioned species is particularly similar to that of *C. andereggii* with an isolated occurrence around the Gulf of Finland (*E. pernotata* ssp. *enictata* PELLMYR & MIKKOLA, 1985). All these species might have reached the Baltic area in the same dry postglacial period. The dry and sunny summer of the archipelagoes and coastal areas of the Gulf of Finland seems to be the key factor of their northern distribution.

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References

BANG-HAAS, A., 1910. – Neue oder wenig bekannte palaearctische Macrolepidopteren. *Dt. ent. Z. Iris*, 24 : 27-51.

BANG-HAAS, O., 1922. – Die Typen der Gattung *Agrotis* der Collection STAUDINGER und Collection BANG-HAAS in Dresden-Blasewitz. *Dt. ent. Z. Iris*, 36 : 31-39.

BOISDUVAL, J. A., 1834. – Icones historiques des Lepidoptères nouveaux ou peu connus. Paris, 192 pp.

——. 1840. – Genera et index methodicus europaeorum lepidopterorum. Parisiis, 238 pp.

BOURSIN, Ch., 1948. – Neue palearktische Agrotis-Arten aus dem Naturhistorischen Museum in Wien nebst Synonymie-Notizen. Beiträge zur Kenntnis der "Agrotidae-Trifinae" XLIV. *Z. wien. ent. Ges.*, 33 : 97-136.

——. 1952. – Beiträge zur Kenntnis der Agrotinae-Trifinae. XLIX. Synonymie-Notizen nebst verschiedenen Bemerkungen. III. *Z. Lepid.*, 2 : 49-68.

——. 1954. – Die "*Agrotis*"-Arten aus Dr. h. c. H. HÖNE's China-Ausbeuten. I. Die Gattung *Diarsia* Hb. (= *Oxira* Wlk.). *Bonner Zool. Beitr.*, 5 : 213-309.

——. 1957. – Notes diverses, synonymiques et critiques. VI (Lep. Phal.). *Bull. Mens. Soc. Linn. Lyon*, 26 : 208-213.

CALLE, J. A., 1982. – Noctuidos espanoles. Minist. Agric., Pesca y Aliment., Fuera de Serie no. 1. 430 pp.

CHERNIN, A., 1974. – Zivotnyi mir Kirowskoi oblasti. Kirow.

CORTI, A., 1929. – Entomologische Ergebnisse der schwedischen Kamtschatka-Expedition 1920-22. 25. Lepidoptera IV. Ophalaenae : 3. Notodontidae und Noctuidae (exp. p.). *Arkiv för Zool.* 21B. No 1 : 1-4.

DERZHAVETS, Yu., IVANOV, A. I., MIRONOV, V. G., MISHCHENKO, D. A., PRASOLOV, V. N. & SINEV, C. Yu., 1986. – Spisok cheshuekrylykh (Macrolepidoptera) Leningradskoy oblasty. *Trudy vses. ent. Obshch.*, 67 : 186-270.

DJAKONOV, A. M., 1968. –Cheshuekrylye (Macrolepidoptera) Leningradskoy oblasty. *Trudi Leningradskogo obshestva estestvoispitateley*, 74 : 1-114.

EVERSMANN, E., 1841. – Nachricht über einige noch unbeschriebene Schmetterlinge des östlichen Russlands. *Bull. obsh. ispytat. prir., otdel. biol.* (Mosc.), 14 : 18-33.

FORBES, W. T. M., 1954. – Lepidoptera of New York and neighbouring states. Memoir 329, 433 pp. Cornell Univ. Agric. Exp. Station.

FORSTER, W. & WOHLFAHRT, T. A., 1971. – Die Schmetterlinge Mitteleuropas. Band IV. Eulen. Franck'sche Verlagshandlung. Stuttgart, 329 pp.

FRANCLEMONT, J. G. & TODD, E. L., 1983. – Noctuidae, pp. 120-159. In : HODGES, R. W. *et al.* The moths of America north of Mexico. E. W. Classey Limited and The Wedge Ent. Res. Found.

GROTE, A. R., 1878. – Descriptions of Noctuidae, chiefly from California. *Bull. U. S. Geol. Surv.*, 4 : 169-187.

HOLDHAUS, K., 1954. – Die Spuren der Eiszeit in der Tierwelt Europas. *Abh. Zool.-Bot. Ges. Wien*, 18 : 1-493.

KOZHANCHIKOV, I. V., 1937 – Sovki (podsem. Agrotinae). Fauna S.S.S.R. Nasekomye cheshuekrylye. XIII, 3. Nov. ser. 15. Izd. AN SSSR, 674 pp.

KOVACS, L. & VARGA, Z., 1973. – Ergebnisse der zoologischen Forschungen von Dr. Z. KASZAB in der Mongolei. 316. Noctuidae : Noctuinae (Lepidoptera). *Folia Ent. Hung.*, 26 : 287-343.

KOZNETZOV, V. I., 1958. – (Neue und wenig bekannte Noctuiden-Arten (Lepidoptera Noctuidae) aus westlichen Kopet-Dagh, Turkmenien). *Ent. Obozr.*, 37 : 183-195.

LINGONBLAD, B., 1960. – *Rhyacia rectangula* F. f. *andereggi*, maalle uusi yökkönen. *Circular Finnish Lep. Soc.* 8/1960.

MERSHEYEVSKAYA, O. I., 1971. — Sovki (Noctuidae) Belorussii. Minsk. 448 pp.

NORDSTRÖM, F., KAABER, S., OPHEIM, M. & SOTAVALTA, O., 1969. — De fennoskandiska och danska nattflynas utbredning. GWK Gleerup, Lund. 152 pp. + 403 maps.

PELLMYR, O. & MIKKOLA, K., 1985. — *Eupithecia pernotata enictata* ssp. n. from southern Finland (Lepidoptera, Geometridae : Larentiinae). *Notul. ent.*, 64 : 54-56.

PETERSEN, W., 1924. — Lepidopteren-Fauna von Estland (Eesti). Tallinn-Reval. 316 pp.

POSPELOV, S. M., SKVORTSOV, V. S. & KRAINOV, Yu. P., 1979. — Vidovoy sostav sovok (Lepidoptera, Noctuidae) Pskovskoy oblasti soobshchenive 1-e : podsemeistva Noctuinae i Hadeninae. *Zashchita resteniy ot vrediteley i boleznev*. Tom. 374 : 36-40.

ROCKBURNE, E. W. & LAFONTAINE, J. D., 1976. — The cutworm moths of Ontario and Quebec. Res. Branch. Canada Dept. of Agric., publ. no. 1593, 164 pp.

SEDYKH, K. F., 1979. — (Macrolepidoptera of Kamchatka and neighbouring regions). *Ent. Obozr.*, 58 : 288-296.

SMITH, J. B., 1895. — Descriptions of new species of Noctuidae. *Ent. News*, 6 : 442-340.

SMITH, J. B., 1907. — Notes on some American noctuids in the British Museum. *J. N. Y. Ent. Soc.*, 15 : 141-162.

SULCS, A. & VIIDALEPP, J., 1969. — Verbreitung der Grossschmetterlinge (Macrolepidoptera) im Baltikum. *Dt. Ent. Z.*, N. F. 16 : 217-272.

STAUDINGER, O., 1892. — Lepidopteren des Kentei-Gebirges. *Dt. ent. Z. Iris*, 5 : 300-394.

STAUDINGER, O. & REBEL, H., 1901. — Catalog der Lepidopteren des palaearctischen Faunengebietes. I. Theil : Famil. Papilionidae-Hepialidae. R. Friedländer & Sohn. Berlin. 411 pp.

TODD, E. L., 1982. — The noctuid type material of John B. Smith. Tech. Bull. U. S. Dept. Agric. 1645. 228 pp.

WARNECKE, G., 1953. — Über postglaziale Arealdisjunktionen europäischer Macrolepidopteren. Dtsch. Emtomologentag (Hamburg) 1953, 33-47.

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Beitrag zur Kenntnis der paläarktischen Douglasiidae (Lepidoptera) : *Tinagma klimeschi* sp. n., aus Rhodos

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Zusammenfassung

Tinagma klimeschi wird als neue Art von der Insel Rhodos beschrieben. Durch Untersuchung des Holotypus von *Tinagma grisescens* STAINTON, 1867 wurde festgestellt, daß *T. tabghana* AMSEL, 1935 ein Synonym zu dieser Art ist.

Summary

Tinagma klimeschi is described as a new species from Rhodos. The examination of the holotype of *Tinagma grisescens* STAINTON, 1867 has shown that *T. tabghana* AMSEL, 1935 is a synonym of this species.

Durch die Freundlichkeit von Dr. J. KLIMESCH/Linz erhielt ich eine größere Falterserie von der Insel Rhodos zur Determination zugeschickt. Die Falter wurden an *Echium diffusum* gefangen. Die Untersuchung ergab, daß es sich hierbei um eine neue Art aus der Gattung *Tinagma* handelt, die nachfolgend beschrieben wird.

Tinagma klimeschi sp. n.

Holotypus ♂, Insel Rhodos, Faliraki, 14.IV.1986, an *Echium diffusum*, leg. Dr. J. KLIMESCH, Gen. Präp. R. GAEDIKE Nr. 3119 ; Paratypen vom gleichen Fundort : 1 ♂, 2 ♀ gleiches Datum ; 1 ♂, 4 ♀ 15.IV.1986 ; 1 ♂, 3 ♀ 13.IV.1986 ; 1 ♀ 16.IV.1986 ; 1 ♀ 19.IV.1986 ; 1 ♀ 24.IV.1985 ; 1 ♂ 14.IV.1983. Der Holotypus und Paratypen in der Sammlung Dr. J. KLIMESCH/Linz, weitere Paratypen in der Sammlung der Abt. Taxonomie der Insekten des Institutes für Pflanzenschutzforschung Kleinmachnow, Bereich Eberswalde.

Falter (Fig. 1-2) : Spannweite 7-9 mm ; Kopf, Thorax und Antennen grau, silbern glänzend. Palpen auf der Oberseite fast weiß. Beim ♂ Vorderflügel ebenfalls grau beschuppt, stark glänzend. In der Mitte eine weiße Querbinde,

Fig. 1-4. *Tinagma klimeschi*: 1. ♂; 2. ♀. *T. balteolellum*: 3. ♂; 4. ♀.

die fast vertikal auf dem Hinterrand steht, zur Flügelbasis scharf abgesetzt, zur Flügelspitze mit verwischter Grenze, unterhalb des Vorderrandes breiter. Apikale Flügelhälfte mit helleren Schuppen durchsetzt, vor allen Dingen um die Spitze herum auf den Fransen.

Die ♀ mit dunkler graugefärbtem Vorderflügel, die weiße Querbinde steht schräg auf dem Hinterrand, in der gesamten Ausdehnung gleichbreit, auch zum Apex scharf abgesetzt. Auf den Fransen um die Flügelspitze mit zahlreichen zweifarbigen Schuppen (Basis und Spitze dunkelgrau, getrennt durch einen fast weißen Streifen).

♂ Genital (Fig. 5-8): Im Bau des Kopulationsapparates nicht deutlich von *T. balteolellum* (Fischer von Roeslerstamm, 1841) zu unterscheiden. Der Aedoeagus ist kräftiger gebaut, der Valvenanhang deutlich zwiebelförmig, nicht so gleichmäßig schmaler werdend.

♀ Genital (Fig. 9-13): Letztes Abdominalsternit mit einer deutlich abgesetzten stark sklerotisierten Kante. Die Sklerotisierung um das Ostium herum mit einer ringförmigen Basis und zwei in eine oder mehrere Spitzen ausgezogenen Zipfeln, der Gesamtumriß etwas birnenförmig, die größte Breite vor der Mitte, dahinter sich stärker verengend. Signum besteht aus 20-30 langen Dornen. Die bedornte Sklerotisierung zwischen den Apophysen ist relativ breit und parallelseitig.

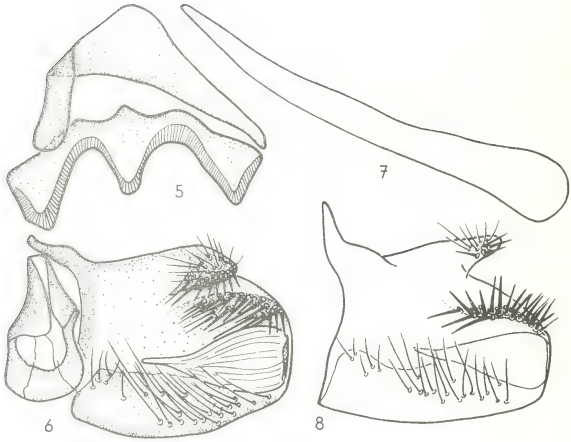

Fig. 5-8. *Tinagma klimeschi*, ♂ Genital. 5. Tegumen-Vinculum ; 6. Anellus, rechte Valve ; 7. Aedoeagus ; 8. Valve, präparationsbedingte andere Form.

Biologie : Die Falter wurden an *Echium diffusum* gefangen.

Untersuchtes Material : 5 ♂, 12 ♀.

Die neue Art steht *T. balteolellum* am nächsten. Sie unterscheidet sich aber von dieser durch das Vorhandensein der weißen Querbinde in beiden Geschlechtern (bei *balteolellum* besitzen die Männchen nur einen weißen Hinterrandfleck, Fig. 3-4). Die Gesamtfärbung der Flügel ist bei *balteolellum*, im Gegensatz zu *klimeschi*, mehr braungrau. Im Bau des Genitalapparates bestehen nur bei den Weibchen deutliche Unterschiede : bei *balteolellum* (Fig. 14-16) fehlt die Sklerotisierung des Hinterrandes des letzten Sternits und die Ostiumsklerotisierung ist in der Grundform mehr oval, die größe Breite liegt in der Mitte. Die bedornte Sklerotisierung zwischen den Apophysen ist schmaler und kleiner.

Ich widme diese neue Art ihrem Entdecker, Herrn Dr. J. KLIMESCH.

Bei der Revision der paläarktischen Douglasiidae wurde die von STAINTON 1867 als *Tinagma grisescens* beschriebene Art nicht mit in Betracht gezogen, weil sie von STAUDINGER & REBEL (1901) als Vertreter der Heliozelinae aufgefaßt wurde. Herr J. KYRKI (†), Rovaniemi, machte mich freundlicherweise darauf aufmerksam, daß es sich bei dieser Zuordnung um einen Fehler handelt. Die Untersuchung des ♂ Holotypus, für dessen Ausleihe ich Herrn

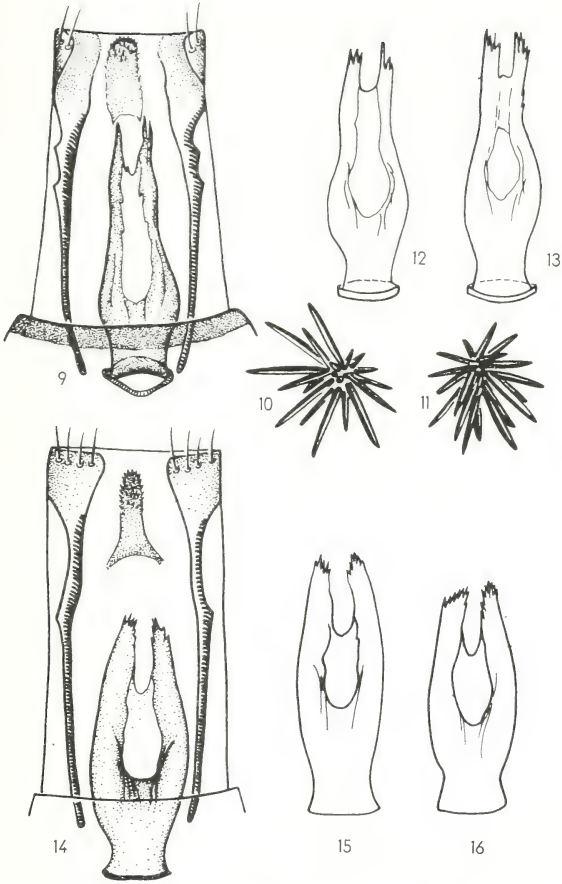

Fig. 9-13. *Tinagma klimeschi*, ♀ Genital. 9. Ostiumkomplex und letztes Sternet ; 10, 11. Signum mit verschiedener Dornenzahl ; 12, 13. Variabilität der Ostiumbildung.
Fig. 14-16. *T. balteolellum*, ♀ Genital. 14. Ostiumkomplex und letztes Sternit ; 15, 16. Variabilität der Ostiumbildung.

Dr. SATTLER/London herzlich danken möchte, ergab, daß *grisescens* von STAINTON zu Recht in der Gattung *Tinagma* beschrieben wurde. Gleichzeitig stellte sich heraus, daß es sich hierbei um die gleiche Art handelt, die AMSEL 1935 als *Tinagma tabghana* beschrieben hat. Diese wird hiermit als Synonym eingezogen :

Tinagma grisescens STAINTON, 1867
(The Tineina of Syria and Asia minor, London, J. VAN VOORST, p. 51)
Typus : British Museum (N.H.) London
Terra typica : "Palästina", ♂ Holotypus, Gen. Präp. K. SATTLER Nr. 23732.
Synonym :
Tinagma tabghana AMSEL, *Mitt. zool. Mus. Berlin* **20**, p. 293, Taf. 12, Fig. 134 ; 1935, **Syn. nov**.

GAEDIKE, 1974, p. 88-89, Fig. 16-18 (♂ Genit., als *tabghanum*).

Die Art wurde bisher nur von den typischen Fundorten bekannt.

Literatur

GAEDIKE, R., 1974. Revision der paläarktischen Douglasiidae (Lepidoptera). *Acta faun. ent. Mus. Nat. Pragae*, **15**, Nr. 176, 79-102, 69 Fig.
STAUDINGER, O. & REBEL, H., 1901. – Catalog der Lepidopteren des paläarktischen Faunengebietes. Berlin, **2**, XXX und 779 S.

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Noctua warreni sp. n., a new sibling species of *Noctua comes* HÜBNER, 1813 from Cyprus (Lepidoptera : Noctuidae)

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Summary

Noctua warreni sp. n., a sibling species of *Noctua comes* HÜBNER, 1813 is described from Cyprus. All specimens from adjoining areas (mainland Greece, Asia minor and Syria) have so far proved to be *N. comes*. Externally, the new species cannot be distinguished from *N. comes*. The genitalia exhibit considerable differences, as is usual for the genus *Noctua* LINNAEUS, 1758. The name *fumida* WARREN, 1909 in SEITZ (1909-1914), used to describe a form of *N. comes* from Cyprus is considered to be infrasubspecific.

Zusammenfassung

Noctua warreni sp. n., eine Zwillingsart zu *Noctua comes* HÜBNER, 1813, wird beschrieben. Die habituell von *N. comes* nicht zu unterscheidende Art stammt aus Cypern. Aus angrenzenden Gebieten (griechisches Festland, Kleinasien und Syrien) konnte bis jetzt nur *N. comes* nachgewiesen werden. Die Genitalarmaturen zeigen, wie in der Gattung *Noctua* LINNAEUS, 1758 üblich, erhebliche Unterschiede. Der von W. WARREN in SEITZ (1909-1914) für aberrative, cypriotische Stücke von *N. comes* vergebene Name "ab. *fumida*" ist infrasubspezifisch und war daher nicht zu berücksichtigen.

Introduction

Faunistic studies induced the author to examine some Cypriotic specimens from the series of *Noctua comes* HÜBNER, 1813 in the collection of the Museum of Natural History in Vienna. The noctuids were found to belong to a new species, despite being externally very similar to the well known and common *N. comes*. The two taxa are markedly different in genital-morphology. It can be considered as a typical sibling-species of *N. comes*. In 1909 W. WARREN, in SEITZ (1909-1914), described a new aberration : "*Rhyacia orbona* HUFN. (= *comes* HBN.) ab. *fumida* nov.". The first opinion of the author was, to preserve the name given by WARREN and revise its status.

However, according to Article 45 (f) and the glossary of the "International Code of Zoological Nomenclature, ed. 3, 1985", a name described as an aberration is unequivocally of infrasubspecific rank if used to denote a number of individuals within a species. Furthermore, as WARREN described other taxa in the same work as sp. nov., ssp. nov., form nov. and ab. nov., he clearly considered his ab. nov. as infrasubspecific. The name does not seem to have been given specific or subspecific rank prior to 1985. The original description reads as follows :

"... lastly, a very distinct *ab.* **fumida** *nov.* from Cyprus has a dark fuscous forewing tinged with grey ; the lines and edges of stigmata grey ; the fringe wholly fuscous ; hindwing wholly smoky orange ; Underside with no red tinge ; the forewing dull yellow-grey, the hindwing greyish yellow ...". WARREN in SEITZ, vol. 3 (1909-1914), p. 42 (engl. ed. issued 24.8.1909).

It is interesting to note that in the german edition issued 14.9.1909, this taxon is described as "eine sehr abweichende Form ab. **fumida** *form. nov.*". It is clear that WARREN did not appreciate the real taxonomic status of the Cypriotic populations. To assume the old name "*fumida*" for the new species could cause much confusion in the future. It was therefore decided to give the taxon a new name.

***Noctua warreni* sp. n.** (figs. 1-2)

Holotype : Male : "Cypern, Platraes, Werner, 31.V.35", "GU-Lödl-No. 102 (23.2.1987)" = Mus. Vind. gen. slide No. 13.857. In coll. Naturhistorisches Museum Wien.

Paratypes : 13 paratypes in coll. Naturhistorisches Museum Wien :

Zypern, Troodos Geb., ndl. Troodos, 1500 m, M.u. E. Arenberger (2 ♂ 19.-28.7.81 ; 1 ♂, 1 ♀ 20.7.-1.8.81).
Zypern, Salzsee westl. Larnaca, M.u. E. Arenberger (1 ♀ 15.8.83, Mus. Vind. gen. slide No. 13.859).
Zypern, Troodos Geb., ndl. Ayii Vavatsinias, Kionia, 1400 m, M.u. E. Arenberger (1 ♀ 7.8.83, Mus. Vind. gen. slide No. 13.860).
Cypern, Platraes, Werner (1 ♂, 2 ♀ 28.5.35, Mus. Vind. gen. slides No. 13.854, 13.856, 13.858 ; 1 ♀ 30.5.35 ; 1 ♂, 1 ♀ 31.5.35, Mus. Vind. gen. slide No. 13.853).
Cypern, Nicosia, B. Haas (1 ♀ 5.-6.13, Mus. Vind. gen. slide No. 13.855).

22 paratypes in coll. British Museum (Natural History), London :

Cyprus, Nicosia, J. A. Bucknill (10.6.09).
Cyprus, Nieosia, G. A. Mavromoustakis (3 specimens June 1921 ; Nieosia probably should read "Nicosia").

Fig. 1. *Noctua warreni* sp. n., ♂ Holotype (Cyprus, Platraes) Wingspan 40 mm.

Fig. 2. *Noctua warreni* sp. n., ♀ Paratype (Cyprus, Troodos Mts.) Wingspan 42 mm.

Mts. of Cyprus, D. M. A. Bate (1903).
Cyprus, Stourovoum Mts., G. A. Mavromoustakis (5.22).
Cyprus, Troodos, most specimens coll. G. F. Wilson (16.6.16, 21.6.16, 2 specimens 25.6.16, 26.6.16, 3.7.16, 8.7.16, 25.6.18, 7.7.18, 18.7.18).
Cyprus, Limassol, G. A. Mavromoustakis (10.21, 11.21).
Cyprus, Platres, Hayward (6.21, 2 specimens 30.7.21).
Cyprus, Agric. Res. Inst., W. R. Ingram, m.v. trap (21.5.1971).

1 paratype in coll. E. ARENBERGER (Wien) :

Zypern, Troodos Geb., ndl. Troodos, 1500 m, M.u. E. Arenberger (19.-28.7.81).

1 paratype in coll. LÖDL (Langenzersdorf) :

Zypern, Troodos Geb., ndl. Troodos, 1500 m, M.u. E. Arenberger (19.-28.7.81).

Dedication : The new species is dedicated to the famous British lepidopterist, the late W. WARREN.

Description : Wingspan 36-45 mm. Antenna shortly ciliate. The forewing varies from pale greyish brown to pale red brown, and from dark grey to mottled clay. The reniform and orbicular stigmata vary from being concolorous with the ground colour to nearly black. One female specimen has nearly black stigmata on pale clay-coloured wings (fig. 2, ♀-paratype). In dark specimens the terminal and post-median fascia is of lighter, pale grey tone. Especially in pale specimens the post-median lines are represented by a series of blackish dots. The hindwing-upperside is orange yellow with an irregular dark brown subterminal band and a dark distal spot. The costal and subterminal regions of the forewing underside and the costal margin of the hindwing underside are tinged reddish brown.

Male genitalia : (figs. 3, 5, 7, 9) : Proximal part of valva broad, elbowed along the dorsal margin. Distal end slightly curved and tapered. Ampulla distal to elbow, slim and curved, not club-shaped. Aedeagus short, coecal part cluttered with short scobiform patches. Medial part of aedeagus very finely granulated. Cornutus sclerotized, big and cone-shaped. No area of small sclerotized spines near cornutus.

Female genitalia (figs. 11-12) : Caudal part of ductus bursae long and sclerotized, membranous part short. Proximal end of ductus bursae not enlarged. Corpus bursae well separated from cervix, no definite signum recognizable. Angle between corpus and cervix more than 90°. Ductus bursae 1.9 times as long as cervix. Cervix with patterns of sclerotized wrinkles.

Fig. 3. *Noctua warreni* sp. n., ♂ Paratype (Cyprus, Platraes) ; Valva, Mus. Vind. gen. slide No. 13.853.

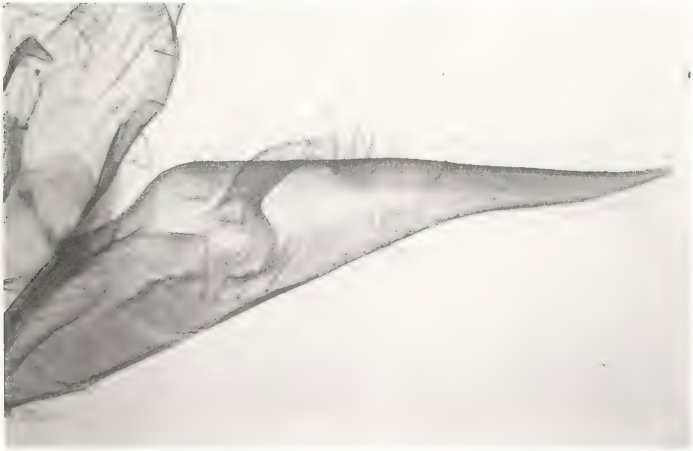

Fig. 4. *Noctua comes* HÜBNER, 1813, ♂ (Corsica) ; Valva ; Mus. Vind. gen. slide No. 13.864.

Fig. 5. *Noctua warreni* sp. n., ♂ Holotype (Cyprus, Platraes) ; Aedeagus ; Mus. Vind. gen. slide No. 13.857.

Fig. 6. *Noctua comes* HÜBNER, 1813, ♂ (Albania) ; Aedeagus ; Mus. Vind. gen. slide No. 13.862.

Fig. 7. *Noctua warreni* sp. n., ♂ Holotype (Cyprus, Platraes) ; Aedeagus detail : Cornutus ; Mus. Vind. gen. slide No. 13.857.

Fig. 8. *Noctua comes* HÜBNER, 1813, ♂ (Corsica) ; Aedeagus detail : Cornutus ; Pinker-GU 105/63 (in coll. Naturhistorisches Museum Wien).

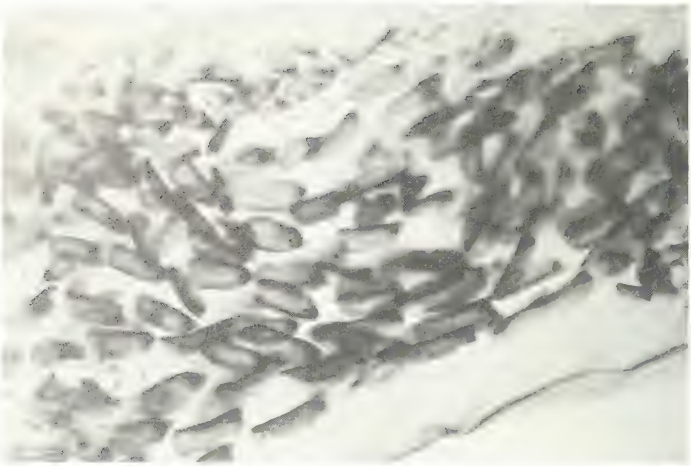

Fig. 9. *Noctua warreni* sp. n., ♂ Holotype (Cyprus, Platraes) ; Aedeagus detail : Coecum with scobiform patches ; Mus. Vind. gen. slide No. 13.857.

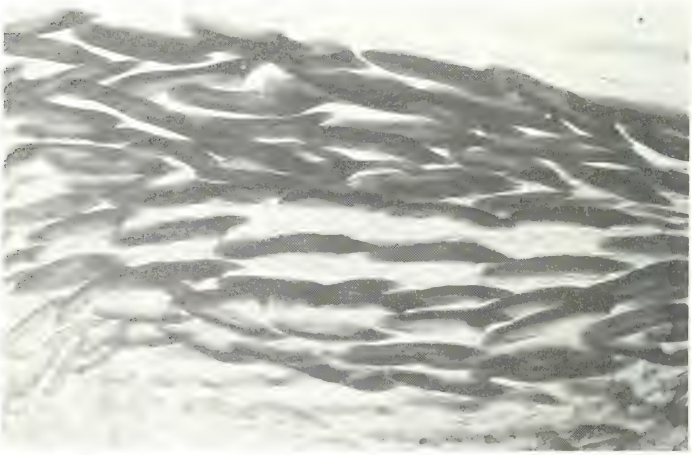

Fig. 10. *Noctua comes* HÜBNER, 1813, ♂ (Corsica) ; Aedeagus detail : Coecum with scobiform patches ; Pinker-GU 105/63 (in coll. Naturhistorisches Museum Wien).

Discussion

A comparison of *N. warreni* with its closely related species *N. comes* demonstrates many remarkable differences. The two species can easily be separated in the male. The author's experience is that *N. comes* exhibits relatively little variation in the male genitalia. As BURMANN & TARMANN (1986) indicate in their publication on a new alpine subspecies of *N. comes*, the valva of all smaller subspecies seem to be shorter than in other subspecies. The male genitalia of these smaller forms are of more compact shape, which might simply be a consequence of the more compact nature of the specimens themselves and are not specific differences. The author of the present publication studied *N. comes*-material from England, Central-Europe, France, Spain, Corsica, Sardinia, Italy, Albania, Greece, Turkey and Syria. The genital-morphology of the populations of Cyprus is quite different, and without doubt of specific value. The proximal part of the valva is much narrower in *N. comes* (fig. 4) than in *N. warreni* (fig. 3). The base of the valva is broad in *N. warreni* and strikingly elbowed on the dorsal margin. The ampulla is club-shaped in *N. comes* and large in relation to the long, narrow and straight distal end of the valva, whereas that of *N. warreni* is slightly curved and rather slim. The distal ends of the valva are slightly curved in *N. warreni*. Remarkable differences can also be found in the aedeagus. Especially striking is the different shape of the cornutus (figs. 7-8, vesica inverted). The strongly sclerotized and big cornutus is cone-shaped in *N. warreni*, without a neighbouring area of small spines. The cornutus of *N. comes* is always shaped like a long tooth, situated near an area of small sclerotized spines. The coecum in both species possesses a dense cluster of scobiform patches, which are long and narrow in *N. comes* (fig. 10), short and compact in *N. warreni* (fig. 11). The angle between corpus bursae and cervix is not so wide in *N. comes* as in *N. warreni*. *N. warreni* shows the corpus and cervix well separated, considered by the author as being two separate organs. The cervix of *N. comes* is larger than that of *N. warreni* (ratio of length of ductus bursae : cervix is 1,3-1,6 in *N. comes*, compared to ca. 1,9 in *N. warreni*). The wrinkles are more strongly sclerotized in *N. comes* and, particularly in the proximal part of the cervix, are remarkably well aligned. The extent of the variation in the external appearance of *N. warreni* seems to be equal to that of *N. comes*.

Distribution : To the best of the authors knowledge, the new species only occurs in Cyprus. It appears therefore to be a further endemic species of this island. *N. comes* could not be found in Cyprus.

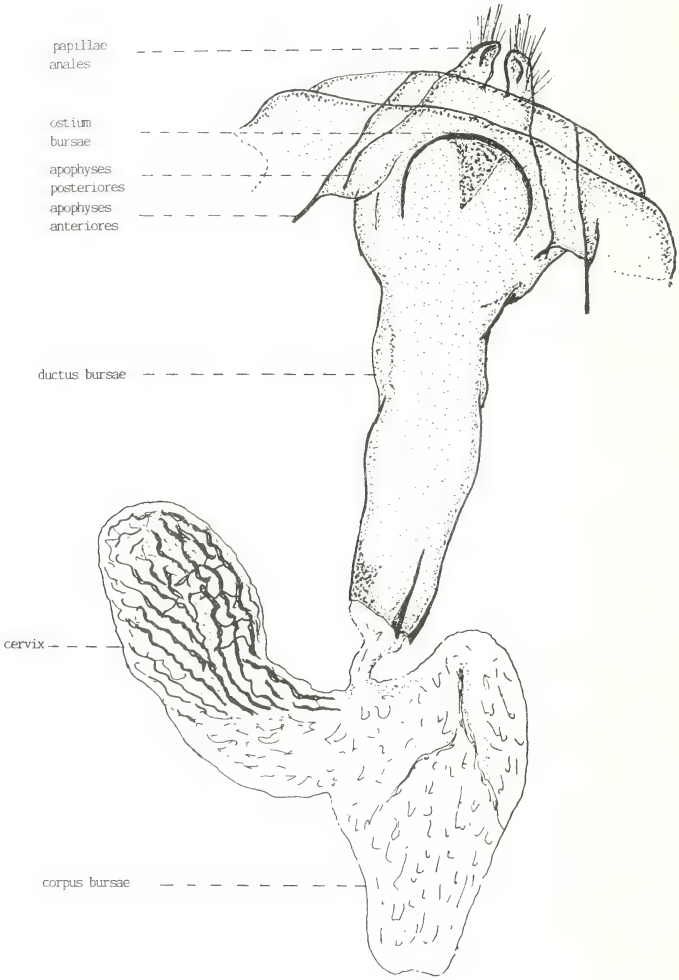

Fig. 11. *Noctua warreni* sp. n., ♀ Paratype (Cyprus, Platraes); Mus. Vind. gen. slide No. 13.856.

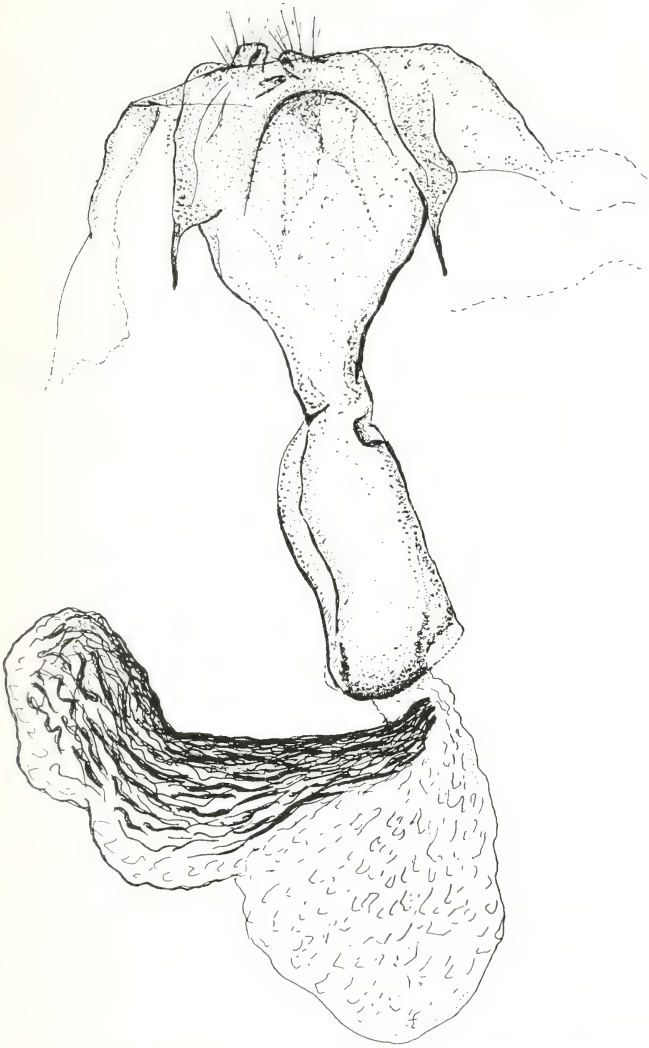

Fig. 12. *Noctua comes* HÜBNER, 1813, ♀ (France) ; Mus. Vind. gen. slide No. 13867.

Acknowledgements

The author is indebted to Mr. M. Honey (BMNH, London) for generously providing assistance in every day. Further gratitude is expressed to Director E. Arenberger (Wien), who kindly presented a large number of specimens as a gift to the Museum of Natural History in Vienna. Special thanks are posthumously extended to Dipl. Ing. Rudolf Pinker (Wien), whose unexpected decease was a shock for his friends and colleagues. The author was fortunately able to discuss the *N. warreni*-problem with Dipl. Ing. Pinker some weeks before he died and received relative material from his collection for further studies.

References

BURMANN, K. & TARMANN, G. (1986): Zwei neue Unterarten von *N. comes* (HÜBNER [1809-1813]) aus dem Ostalpenraum (Insecta, Lepidoptera: Noctuidae). – *Ann. Naturhist. Mus. Wien* 88/89, Ser. B: 727-732, 1 pl.

WARREN, W. (1909-1914): Noctuidae. In: SEITZ, A.: The Macrolepidoptera of the World. Vol. 3, Engl. ed. Stuttgart.

WARREN, W. (1909-1914): Noctuidae. In: SEITZ, A.: Die Großschmetterlinge der Erde. Band 3, Deutsche Ausgabe, Stuttgart.

Nota lepid. 10 (3) : 175-182 ; 31.X.1987 ISSN 0342-7536

Revisionary notes on the genus *Achyra* GUENÉE with a new synonym and the description of *Achyra takowensis* sp. n. (Lepidoptera : Pyralidae, Pyraustinae) (Studies on Pyralidae I)

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Abstract

The nomenclature and the diagnostic characters of the genus *Achyra* GUENÉE are discussed. Besides the known synonyms *Eurycreon* LEDERER and *Tritaea* MEYRICK, *Dosara* WALKER is also considered as a new synonym for the genus. The following species are placed under *Achyra* : *affinitalis* (LEDERER) with its synonym *ustalis* (WALKER) ; *bifidalis* (FABRICIUS) with its synonyms *evanidalis* (BERG), *inornatalis* (WALKER), *obsoletalis* (BERG) and *stolidalis* (SCHAUS) ; *brasiliensis* (CAPPS) ; *coelatalis* (WALKER) comb. n. ; *eneanalis* (SCHAUS) ; *llaguenalis* MUNROE ; *massalis* (WALKER) comb. n. ; *nudalis* (HÜBNER) with its synonym *interpunctalis* (HÜBNER) ; *occidentalis* (PACKARD) ; *piuralis* (CAPPS) ; *protealis* (WARREN) ; *rantalis* (GUENÉE) with its synonyms *caffrei* (FLINT & MALLOCK), *collucidalis* (MÖSCHLER), *communis* (GROTE), *crinisalis* (WALKER), *crinitalis* (LEDERER), *diotimetalis* (WALKER), *intractella* (WALKER), *licealis* (WALKER), *murcialis* (WALKER), *nestusalis* (WALKER), *posticata* (GROTE & ROBINSON), *similalis* auct., nec GUENÉE *siriusalis* (WALKER) and *subfulvalis* (HERRICH-SCHÄFFER) ; *similalis* (GUENÉE) with its synonyms *ferruginea* (WARREN) and *garalis* (SCHAUS). A new species from Taiwan *A. takowensis* sp. n. is described.

Foreword

This paper is the first in a series on the systematics of the Pyralidae, especially the Pyraustinae, of the world. Previously, a study was made on the usefulness of different morphological structures including tympanal organs. The description, preparation technique and a list of references of the latter are given in MAES, 1985.

Introduction

The genus *Achyra* was established by GUENÉE in LUCAS, 1849, for the two nominal species *Pyralis interpunctalis* HÜBNER, 1796 and *Pyralis nudalis*

HÜBNER, 1796. HÜBNER, 1796, 6, p. 11, nr. 11 described *interpunctalis* as a nominal species, but suggested at the same time that it was probably a subspecies of *nudalis* HÜBNER, 1796 6, p. 11, nr. 10. GUENÉE, 1849, in establishing the genus *Achyra*, suggested that *interpunctalis* HÜBNER and *nudalis* HÜBNER were one species. MARION, 1957, designated *Pyralis interpunctalis* HÜBNER as type-species of *Achyra* GUENÉE. He cited in error *interpunctalis* as «désignation originelle». He considered *interpunctalis* synonymous with *nudalis*. MUNROE, 1976 : p. 45 in his revision of the North American species of the genus *Achyra* also cited erroneously *interpunctalis* as "original designation". Following MARION, 1957, he considered *interpunctalis* synonymous with *nudalis*. FLETCHER and NYE, 1984 correctly considered *Pyralis interpunctalis* HÜBNER as type-species of the genus *Achyra*, designated by subsequent designation by MARION, 1957.

After studying several species of the genus *Achyra*, the names *interpunctalis* and *nudalis* were found to apply to the same species. From the original descriptions of *interpunctalis* and *nudalis* in LUCAS, 1849, *interpunctalis* is a junior subjective synonym of *nudalis*.

Diagnostic characters

Externally, species belonging to the genus *Achyra* are difficult to distinguish from species belonging to other related genera. The genus can be recognized from other Pyraustinae genera by a series of characters in the genitalia. Morphological structures in the tympanal organs proved to be important at the genus and species level.

The male genitalia have the uncus triangular, dorsally with simple setae. The valvae are rounded, and a well developed transtilla is present with strongly developed ventral processes. As most Pyraustinae, the valvae have a sella and an editum. The sella is a simple lobe, distally with minute spines. The editum is placed dorso-laterally of the sella. The scales on the editum are long, flattened in the middle and ending in a point. The sacculus can be simple or modified, having strongly sclerotized spines. The juxta consists of two plates ventrally fused and as such forming a U or a V. The aedeagus is straight ; the cornutus can consist of a plate or different spines.

The female genitalia have a rhomboid signum and a second smaller signum at the base of the appendix bursae.

The tympanal organs are strongly invaginated. The fornix tympani is narrow, the saccus tympani shallow. The venula secunda clearly reaches beyond the bulla tympani.

Discussion

After completing a study of this genus on material from the different zoogeographical regions, the following synonymy could be established :

Achyra GUENÉE, 1849, *in* Lucas, *Exploration Scientifique de l'Algérie*, 3 : 404.

Type-species : *Pyralis interpunctalis* HÜBNER, 1796, *Samml. eur. Schmett.* 6 : p. 11, nr. 11, pl. 19, fig. 128, by subsequent designation by Marion, 1957, *Entomologiste* 13 : 83.

Note : *Pyralis interpunctalis* HÜBNER, 1796 is a junior subjective synonym of *P. nudalis* HÜBNER, 1796.

Dosara WALKER, 1859, *List Specimens lepid. Insects Colln. Br. Mus.* 19 : 811 (key), 828. **syn. nov.**

Type-species : *Dosara coelatalis* WALKER, 1859, *ibidem*, 19 : 829, by original designation.

Eurycreon LEDERER, 1863, *Wien. ent. Monatschr.* 7 : 366, 376.

Type-species : *Pyralis nudalis* HÜBNER, 1796, *Samml. eur. Schmett.* 6 : p. 11, nr. 10, pl. 14, fig. 90, by subsequent designation by SHIBUYA, 1928, *J. Fac. Agric. Hokkaido imp. Univ.* 22 : 267.

Note : *Eurycreon* was established as a subgenus of *Botys* LATREILLE, [1802].

Tritaea MEYRICK, 1884, *Trans. ent. Soc. Lond.* 1884 : 292 (key), 341.

Type-species : *Scopula ustalis* WALKER, [1886] 1865, *List Specimens lepid. Insects Colln. Br. Mus.* 34 : 1477, by monotypy.

Note : *S. ustalis* is a junior subjective synonym of *Botys affinitalis* LEDERER, 1863.

The following species and their synonyms could be placed under the genus *Achyra* :

affinitalis (LEDERER, 1863)
  ustalis (WALKER, [1866])
bifidalis (FABRICIUS, 1794)
  evanidalis (BERG, 1875)
  obsoletalis (BERG, 1875)
  inornatalis (WALKER, [1866])
  stolidalis (SCHAUS, 1940)
brasiliensis (CAPPS, 1967)
coelatalis (WALKER, 1859) **comb. n.**
eneanalis (SCHAUS, 1923)
flaguenalis MUNROE, 1978
massalis (WALKER, 1859) **comb. n.**
nudalis (HÜBNER, 1796)
  interpunctalis (HÜBNER, 1796)
occidentalis (PACKARD, 1873)
piuralis (CAPPS, 1967)
protealis (WARREN, 1892)
rantalis (GUENÉE, 1854)
  caffreii (FLINT and MALLOCK, 1920)
  collucidalis (MÖSCHLER, 1890)
  communis (GROTE, 1876)
  crinisalis (WALKER, 1859)
  crinitalis (LEDERER, 1863)
  diotimetalis (WALKER, 1859)
  intractella (WALKER, 1863)
  licealis (WALKER, 1859)
  murcialis (WALKER, 1859)
  nestusalis (WALKER, 1859)
  posticata (GROTE and ROBINSON, 1887)
  similalis auct., nec GUENÉE, 1854
  siriusalis (WALKER, 1859)
  subfulvalis (HERRICH-SCHÄFFER, 1871)
similalis (GUENÉE, 1854)
  ferruginea (WARREN, 1892)
  garalis (SCHAUS, 1906)

In addition to these species a new species was found from Taiwan :

***Achyra takowensis* sp. n.**

Holotype : ♂ Takow Formosa 13.08.1904 A. E. WILEMAN, 296, WILEMAN Coll. BM 1926-261 : Pyralidae BM slide no 17406 ♂

Paratype : ♀ Takow Formosa 13.08.1904 A. E. WILEMAN, WILEMAN Coll. BM 1926-261 ; Pyralidae BM slide no 17407 ♀.

Both types are placed in BMNH.

Description

External characters, ♂+ ♀ (figs. 1, 2) : frons conical, smoothly scaled ; vertex with erect scaling ; eyes and ocelli normally developed ; maxillary palpi prominent, with long scales ; labial palpi porrect, third segment scaled to a point, dorsally light-brown, ventrally white ; antennae filiform ; thorax, tegulae, abdomen dorsally brown-yellow ; forewing length 7.3 mm (paratype) to 7.5 mm (holotype), apex slightly rounded, termen almost straight ; antemedial zone not distinguishable ; medial zone brown to dark-brown ; postmedial line almost straight, originating slightly before the apex ; claviform stigma present, dark-brown ; postmedial zone light-brown ; termen dark-brown lined ; fringe grey-brown ; hindwings brown-yellow somewhat darker brown near the fringe ; fringe as in forewing ; forewings beneath brown, costa and postmedial zone brown-yellow ; termen narrowly lined ; hindwings without pattern.

Tympanal organs (fig. 3A) : praecinctorium weakly bilobed ; tympanal organs invaginated ; fornix tympani narrow ; bullae tympani parallel with body axis ; processus tympani very small ; spinula absent ; saccus tympani shallow ; venulae secundae long ; rami tympani slightly curved ; zona glabra tympani with two sclerified rods parallel to the rami tympani, both connected by a transverse bridge.

Genitalia : male (fig. 3B,C) : uncus pointed, dorsally with simple setae ; tuba analis with subscaphium ; tegumen broad ; vinculum with simple saccus ; transtilla well developed, ventrally expanded ; valves identical ; sella strongly developed bearing short spines, editum with simple setae, dorso-distally from sella : juxta consisting of two sclerites ; aedeagus straight, vesica with plate-like cornutus ending in a point.

Female (fig. 3D) : papillae anales with short and long setae ; apophyses normally developed, apophyses posteriores and anteriores of the same length ; sinus vaginalis with minute spines ; ostium bursae ending in a cup-like strongly sclerotized antrum ; ductus seminalis broader at the an-

Fig. 1. *Achyra takowensis* sp. n. holotype ♂ Takow Formosa 13.VIII.1904. A. E. WILEMAN, 296. WILEMAN Coll. BM 1929-261. Pyralidae BM slide no 17406.

Fig. 2. *Achyra takowensis* sp. n. paratype ♀ Takow Formosa 13.VIII.1904. A. E. WILEMAN. WILEMAN Coll. BM 1929-261. Pyralidae BM slide no 17407.

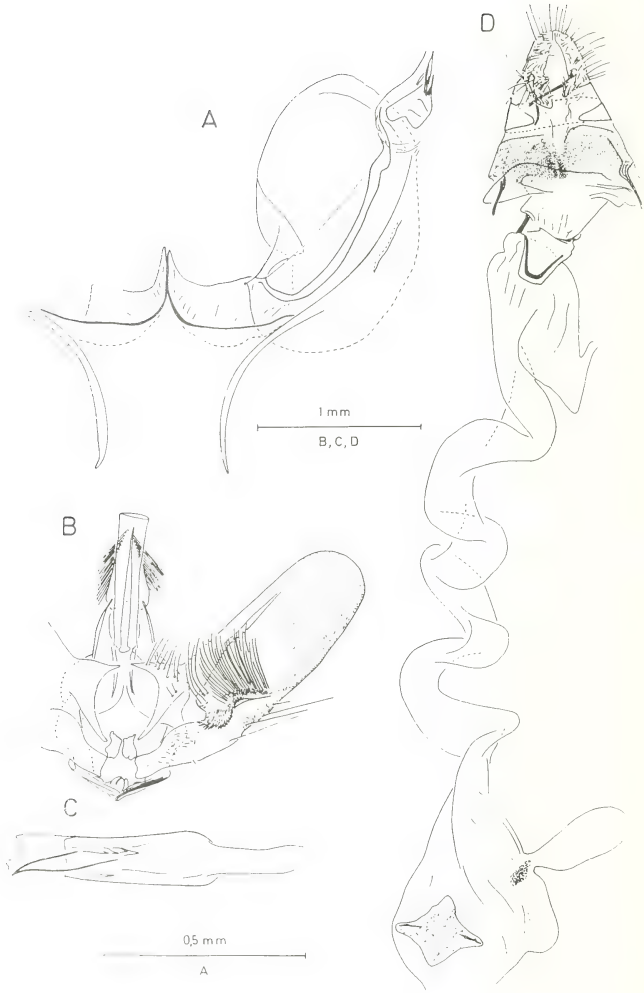

Fig. 3. *Achyra takowensis* sp. n. A : tympanal organs paratype ; B : male genitalia without aedeagus holotype ; C : aedeagus holotype ; D : female genitalia paratype.

trum ; ductus bursae loosely coiled ; corpus bursae with two signa : main signum rhomboid, all four sides of equal length, second signum smaller at the base of the accessory sac.

The early stages are unknown.

Externally, *A. takowensis* sp. n. closely resembles *A. coelatalis* (WALKER) and *A. massalis* (WALKER).

It can easily be distinguished from both species by the structure of the cornutus : *A. coelatalis* having a cornutus with up to a dozen short spines, *A. massalis* with a cornutus consisting of three long, heavy sclerotized spines, and *A. takowensis* with a single plate-like cornutus. The ventral zone of the editum of *A. coelatalis* is characteristically sclerotized. This sclerotized zone is lacking in *A. takowensis*. The editum of *A. massalis* is rather poorly developed.

Phylogenetic relationships

The form and position of the sella and the editum is considered as an autapomorphy for the genus *Achyra*. The ventral extension of the transtilla relates this genus with some species of the genus *Loxostege* HÜBNER, [1825] 1816. MUNROE, 1976 relates the former with the genus *Hahncappsia* MUNROE 1976 on the basis of morphological characters in the genitalia.

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References

FLETCHER, D. S. & NYE, I. W. B., 1984. – The Generic Names of the Moths of the World, volume 5.

GUENÉE, 1849, *in* LUCAS, Exploration Scientifique de l'Algérie pendant ... 1840, 1841, 1842 ... Lépidoptères. Zoologie, 2 (3) : 345-413.

HÜBNER, J., 1796. – Samml. eur. Schmett. 6.

LEDERER, J., 1863. – Beitrag zur Kenntnis der Pyralidinen, *Wien. ent. Monatschr.* 7 : 243-280, 331-502, pl. 2-18.

MAES, K. V. N., 1985. – A Comparative Study of the Abdominal Tympanal Organs in Pyralidae (Lepidoptera). I. Description, terminology, preparation technique. *Nota lepid.* 8 (4) : 341-350.

MARION, H., 1957. – Classification et nomenclature des Pyraustidae d'Europe. *Entomologiste* 13 : 75-87.

MUNROE, E., *in* DOMINICK, R. B. *et al.*, 1976. – The Moths of America North of Mexico, Fasc. 13.2A, Pyraloidea (in part).

WALKER, F., 1859. – List Specimens lepid. Insects Colln. Br. Mus. 19.
WALKER, F., [1886] 1865. – List Specimens lepid. Insects Colln. Br. Mus. 34.
SHIBUYA, J., 1928. – The Systematic Study of the Formosan Pyralidae. *J. Fac. Agric. Hokkaido imp. Univ.* 22 : 1-300, pl. 1-9.
MEYRICK, E., 1884. – On the Classification of Australian Pyralidina. *Trans. ent. Soc. Lond.* 1884 : 61-80, 277-350.

Nota lepid. 10 (3) : 183-192 ; 31.X.1987 ISSN 0342-7536

The defensive biology of the larvae of *Amata (= Syntomis) phegea* L. and *Amata (= Syntomis) kuhlweinii* LEF. (Lepidoptera, Ctenuchidae)

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Zusammenfassung

Die Wehrhaftigkeit der Imagines und Larven der Ctenuchiden wurde aus Literaturdaten zusammengefaßt und das Wehrsystem der Larven zweier *Amata*-Arten beschrieben. Die Larven besitzen ein für Vögel als Freßfeinde höchst unschmackhaftes Wehrsekret. Bei einem Angriff setzen die Larven dieses Sekret in Tropfen durch eine spezielle Struktur, eine Sollbruchstelle am caudalen Ende der großen dorsalen Haarwarzen, frei.

Summary

The defensive properties of Ctenuchid moths and their larvae are reviewed and the defensive system of two species of *Amata* larvae are described. The larvae contain a defensive secretion which is highly unpalatable to avian predators. When attacked these larvae are able to release droplets of this secretion from a specialized structure, a small rupture situated in the caudal part of the large dorsal warts.

Introduction

Moths of the family Ctenuchidae KIRBY, 1837 are known to possess effective defensive properties. MÜLLER (1874) described the release of offensively smelling substances from the coremata of South American Ctenuchid moths, and this is also recorded for *Delphrye rubricincta* HAMPSON by BLEST (1964). The unpalatability of these moths has been shown in feeding experiments with *Scepsis fulvicollis* (HÜBNER), *Syntomeida epilais* WALKER, *S. ipomoeae* (HARRIS) and *Lycomorpha pholus* (DRUCE) (JONES 1932, 1934). Hitherto several compounds causing this unpalatability have been identified : pyrazines in *Amata* species from Australia (ROTHSCHILD et al. 1984), cardiac glucosides in the body tissues of *Syntomeida epilais* WALKER (ROTHSCHILD et al. 1972), a histamine-like compound in *Amata phegea* (L.) and pyrrolizidine alkaloids in Ctenuchid moths from Southern America (BOPPRE 1984). There is little information about the way these substances are sequestered,

stored or utilized, but species, such as *Histaea cepheus* CRAMER from Trinidad can exhibit reflex-bleeding from the thorax, when attacked (BEEBE & KENNEDY 1964).

In several cases it can be shown, that the larval foodplants are the source of these substances. *Syntomeida epilais* larvae feed on *Nerium oleander* (Apocynaceae) and *Echites* sp. and store their cardiac glucosides Oleandrin and Nerigosid (ROTHSCHILD et al. 1972). Similar data are available for other Ctenuchid moths. Many of them seem to have a preference for foodplants containing cardiac glucosides or pyrrolizidine alkaloids (BEEBE & KENNEDY 1957, ROTHSCHILD et al. 1972, PLATT 1921, PINHEY 1979).

Some Ctenuchids, however, such as *Balacra rattray* from India or the European *Amata* species, feed on plants that do not contain any substances known to be pharmacologically active, nevertheless they are well protected. The larvae of *Balacra* are reported to cause severe urtications when rubbed against the skin (JACKSON, 1931), and *Amata phegea* and the allied European species are thought to form the models for a MÜLLERIAN mimicry ring in the Mediterranean area, together with the Zygaenid moth *Zygaena ephialtes* (L.) (BULLINI et al. 1969, SBORDONI & BULLINI 1971, SBORDONI et al. 1979, TURNER 1971).

Until now only very few species have been investigated in order to identify the mechanisms which produce these defensive properties. For example, specialized morphological structures must be related to the reflex-bleeding of *Histaea cepheus*. In *Homoeocera stictosoma* males, BLEST (1964) described a "ventral valve", from which the secretions are released, but he does not give any further details. The larvae especially have never been investigated properly, although they have effective defensive properties as well (JACKSON 1931).

As an example of such larval defensive mechanisms, the exudation of defensive fluid by *Amata* larvae and the corresponding morphological structures are described in this paper.

Materials and methods

The following species were examined : *Amata phegea* from Italy (Friaul, Monte Simeone) and *Amata kuhlweinii* from South Africa (Cape Province, East London). The larvae were fed exclusively on *Plantago longifolia*.

The fourth and fifth larval instars of each species were examined by using the following techniques : histological cross-sections and longitudinal sections, SEM of the surface structures and whole mounts of the larval cuticle after maceration in 10% aqueous KOH.

Results

Larvae of the two *Amata* species examined release droplets of a secretion if they are irritated (fig. 1). These droplets only occur in the region of the large dorsal warts ("I" according to HAMPSON 1898, fig. 4) and consist of a viscous fluid that can be reabsorbed into the body after a few seconds.

Feeding experiments with hand-raised starlings (*Sturnus vulgaris* L.) proved that the larvae are highly unpalatable to these birds. Twelve individually caged starlings were used as predators in this experiment. They were fed with different kinds of prey objects like mealworms, flies, larvae of tipulids and butterflies. Usually they pecked at the offered larvae immediately and ate them without hesitation. After a period of three days each bird received the usual feeding bowl with a mixture of prey objects and one *Amata* larva. All prey objects were eaten as usual, and even the *Amata* larva was pecked at the first approach, but none of them was really harmed as the birds dropped them immediately after pecking and showed obvious signs of distress like shivering, intensive beak wiping, and nervousness. During the next five days the birds always had a *Amata* larva among their food mixture, but after the first experience the starlings never attacked any of them again.

A second experiment, with another group of starlings, was conducted under identical conditions, but using *Amata* larvae whose hairs were carefully

Fig. 1. Larva of *Syntomis kuhlweinii* with droplet of defensive secretion after pinching with tweezers.

removed. The starlings reacted in the same way as quoted above, and after their first experience they always rejected these larvae.

The structures that are significant for this function are localized in a small zone situated at the caudal end of the dorsal warts I (fig. 3, 5). As shown by SEM investigation, this region consists of very smooth cuticle which lacks setae or microtrichia (fig. 4). When the larva is attacked, it raises its internal pressure by contracting the body musculature. With increase of pressure the thin zone breaks open and releases the droplet. When the pressure falls after relaxation of the muscles, a part of the droplet is reabsorbed and a little remains on the surface and closes the fissure by coagulation.

More details are shown in the histological sections (fig. 2, 6). The cuticle in the region of the rupture is extremely thin and has an undulated surface which lacks microtrichia.

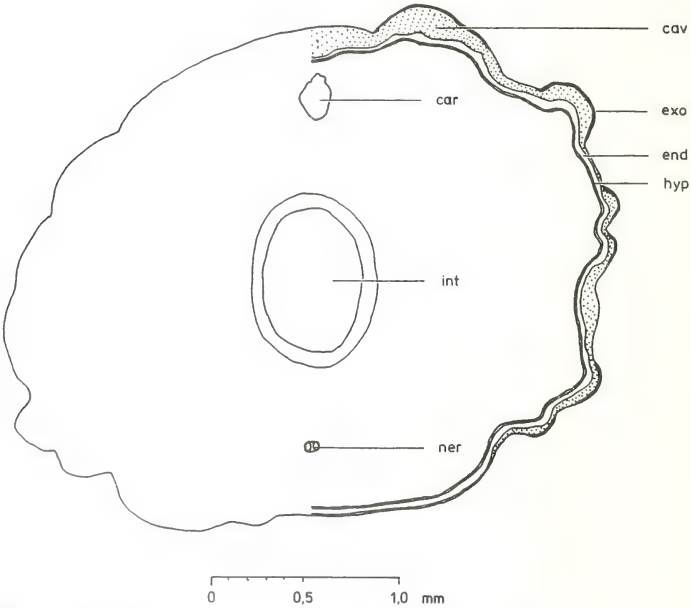

Fig. 2. Cross-section of *Syntomis kuhlweinii* larva. The marked region shows the cavity with defensive secretion. Mag. × 40.
cav = cavity, exo = exo- and mesocuticle, end = endocuticle, hyp = hypodermis, car = heart, int = gut, ner = nervous chord.

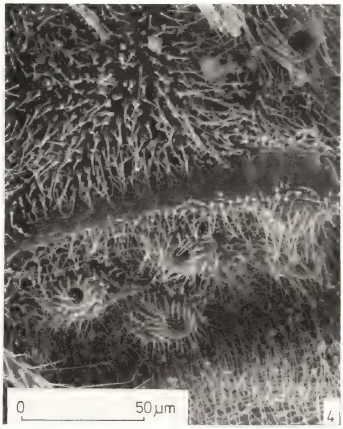

Fig. 3. *Syntomis kuhlweinii*, SEM of the dorsal region of the 4th abdominal segment showing the dorsal warts. The marked area is shown in detail in fig. 4.
Fig. 4. *Syntomis kuhlweinii*, detail from fig. 3, showing the region of the rupture. Smooth cuticle without microtrichia or setae.

The cross-sections of the *Amata* larvae show one single large cavity within the cuticle of each segment ; this cavity is filled with a coagulating substance that definitely differs from the haemolymph. It is not divided to form several separate cavities as in *Zygaena* larvae (FRANZL 1980, FRANZL & NAUMANN 1984) ; instead, there is one large undivided cavity extending from the region of the proleg on one side of the larval body to the other (fig. 2). The main part of the secretion is stored beneath the hairy warts (characteristic for all Ctenuchid larvae) (FRIESE 1959, HAMPSON 1898, JACKSON 1931, SEVASTOPOULO 1941, 1942)) and the dorsal part of the cuticle.

The longitudinal extension of the cavities is shown in figure 6. For a larva in the last instar the cavities have the following size (all data approximate) :

Longitudinal extension in fourth abdominal segment :	3800 µm
Average height of cavity in the dorsal region :	12 µm
Length of rupture in the cuticle of the wart :	250 µm
Average height of rupture :	15 µm

Preliminary studies of the chemical composition of the defensive secretion revealed the occurrence of at least three different proteins and three free amino acids in an aqueous medium. Pyrrolizidine alkaloids or cyanide

-containing compounds, which were shown to be the repellent agencies in many other defensive secretions, could not be found so far, but the chemical analysis of the secretion will be continued.

Discussion

The presence of hairy warts on all body segments of Ctenuchid larvae was described a long time ago. A closer investigation of the defence mechanism

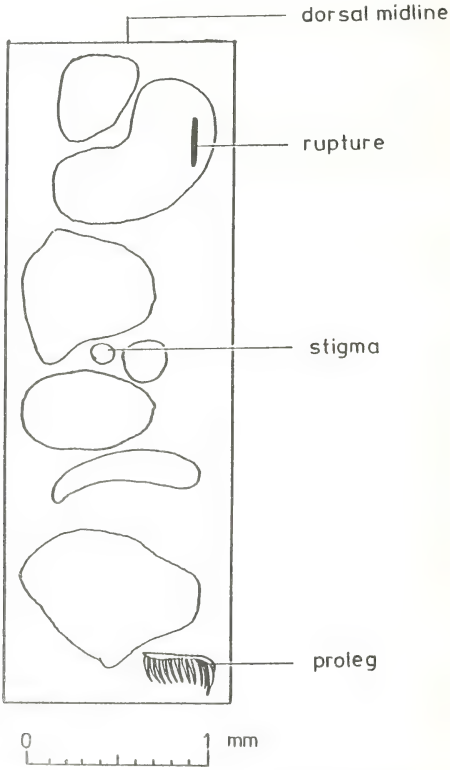

Fig. 5. Diagram of *Syntomis kuhlweinii* last instar larva cuticle, 4th abdominal segment. Only the warts are outlined, leaving out the bases of the setae. KOH-macerate, stained with Chlorazol-black. Mag. × 20.

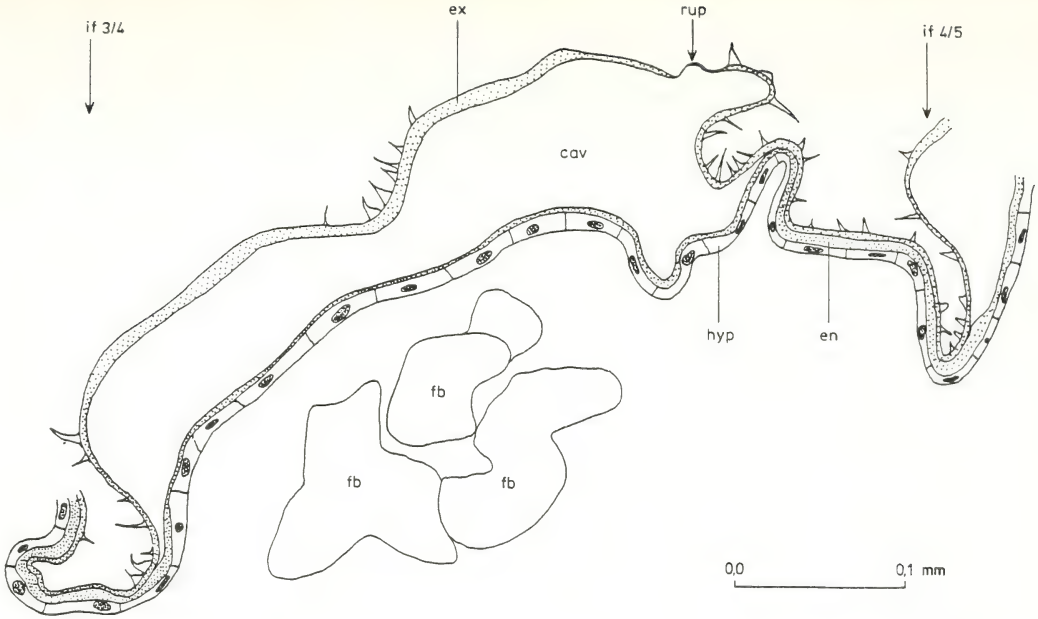

Fig. 6. *Syntomis phegea*, last instar, 4th abdominal segment, longitudinal section, showing the longitudinal extension of the cavity. The region of the fission is marked by an arrow. It is characterized by the very thin exocuticle without setae or microtrichia and by the pleated condition of the surface. Staining Azan, mag. × 400.
cav = cavity, en = endocuticle, ex = exocuticle, fb = fat body, hyp = hypodermis, if 3/4, if 4/5 = intersegmental folds.

in the larvae of two species of *Amata* has revealed a structure in the dorsal warts which enables the larvae to release a droplet of a secretion when attacked. The occurrence of hairy warts on the larval segments is not unusual. Comparable structures can be found, among others, on larvae of Arctiidae, Lymantriidae, Megalopygidae, Noctuidae and Notodontidae (FRACKER, 1915). All of the groups cited above, however, possess urticating hairs or spines (GILMER 1925). A special structure within the cuticle has so far only been described for Zygaenid larvae (FRANZL 1980, FRANZL & NAUMANN 1984).

In the present case it was also shown that the secretion is a very important factor in defence and that the defence mechanism still functions even when the setae are removed. This is demonstrated by the fact that larvae without setae are obviously as unpalatable to the starlings as are those larvae with hairs. This may be an important discovery, because larvae that are due to moult within the next 24 hours lose almost all their hairs before they move to a hiding place for moulting.

The question arises whether it is an advantage for the larvae to exude the secretion when attacked instead of just storing it within the body.

It is possible that the secretion contains additional substances which are offensive when smelled. These could warn those predators that are guided by olfaction and even prevent them from biting into the larva.

Also, insectivorous birds usually keep their prey in the beak for a while before swallowing it or feeding it to their young. This is especially true, if they have found a novel prey object and are still testing its taste (COPPINGER 1969, 1970, SCHULER 1980, 1982). If the larva is not harmed by cautious pecking and it could not exude its secretion, the bird would not experience the foul-tasting substance unless it killed the larva. The reactions of the starlings, however, show that the larvae are highly unpalatable, and as no larva was really injured, the rejection must have been caused by the exuded secretion of the larva.

Literature

BEEBE, W. & R. KENNEDY (1957) : Habitats, palatability and mimicry in thirteen Ctenuchid moths from Trinidad, B.W.I. *Zoologica* (N.Y.), 42 : 147-158 ; New York.

BLEST, A. D. (1964) : Protective display and sound production in some New World Arctiid and Ctenuchid moths. *Zoologica* (N.Y.), 49 : 161-181 ; New York.

BOPPRÉ, M. (1984) : Insects pharmacophagously utilizing defensive plant chemicals (Pyrrolizidine alkaloids). *Naturwissenschaften*, 73 : 17-26 ; Berlin.

BULLINI, L., V. SBORDONI & P. RAGAZZINI (1969) : Mimetismo Mülleriano in

populazione italiane di *Zygaena ephialtes* (L.) (Lepidoptera, Zygaenidae). *Arch. zool. Ital.*, 44 : 181-214 ; Neapel.

COPPINGER, R. P. (1969) : The effect of experience and novelty on avian feeding behaviour with reference to the evolution of warning coloration in butterflies. I. Reactions of wild-caught blue jays to novel insects. *Behaviour*, 35 : 45-60 ; Leiden.

COPPINGER, R. P. (1970) : The effect of experience and novelty on avian feeding behaviour with reference to the evolution of warning coloration in butterflies. II. Reactions of naive birds to novel insects. *Am. Nat.*, 104 : 323-335 ; Salem, Mass.

FRACKER, S. B. (1915) : The classification of lepidopterous larvae. Ill. Biol. Monogr. II (1), 169 pp., University of Illinois.

FRANZL, S. (1980) : Morphologie und Entwicklung der kutikularen Wehrsekretbehälter bei *Zygaena trifolii* (Esper, 1783) (Insecta, Lepidoptera). Staatsexamensarbeit, Universität Bielefeld.

FRANZL, S. & C. M. NAUMANN (1984) : Morphologie und Histologie der Wehrsekretbehälter erwachsener Raupen von *Zygaena trifolii* (Lepidoptera, Zygaenidae). *Ent. Abh. Mus. Tierk. Dresd.*, 48 : 1-12 ; Dresden.

FRIESE, G. (1959) : Zur Biologie und Kenntnis der ersten Stände von *Dysauxes famula* (Frr.) (Lep. Syntomidae). *Dt. Ent. Z.* (NF), 6 : 166-169 ; Berlin.

GILMER, P. M. (1925) : A comparative study of the poison apparatus of certain lepidopterous larvae. *Ann. Ent. Soc. America*, 18 : 203-239, Washington.

HAMPSON, G. F. (1898) : Catalogue of the lepidoptera phalaenae in the British Museum, Vol. I : Syntomidae. London.

JACKSON, T. H. E. (1931) : Life histories of some East African lepidoptera. *J. E. Africa Uganda Nat. Hist. Soc.*, 42/43 : 173-176 ; London.

JONES, F. M. (1932) : Insect coloration and the relative acceptability of insects to birds. *Trans. Ent. Soc.*, 80 : 345-385 ; London.

JONES, F. M. (1934) : Further experiments on coloration and relative acceptability of insects to birds. *Trans. Ent. Soc.*, 82 : 443-453 ; London.

KENDALL, R. O. (1980) : Larval foodplants and life history notes for eight moths from Texas and Mexico. *J. Lep. Soc.*, 30 (4) : 264-271 ; Cambridge, Mass.

MÜLLER, F. (1874) : The habits of various insects. (Letter to Ch. Darwin). *Nature*, 10 : 102-103 ; London.

PINHEY, E. C. G. (1979) : Moths of Southern Africa. A. A. Balkema, Rotterdam.

PLATT, E. E. (1921) : List of foodplants of some South African lepidopterous larvae. *S. Afr. J. Nat. Hist.*, 3 : 65-138 ; Pretoria.

RAMMERT, U. (1985) : Untersuchungen zur Wirksamkeit des Wehrsekretes und des aposematischen Zeichnungsmusters von *Zygaena trifolii* (Esper, 1783) auf unerfahrene Stare (*Sturnus vulgaris* L.). Diplomarbeit, Universität Bielefeld.

ROTHSCHILD, M., J. VAN EUW & T. REICHSTEIN (1972) : Cardiac glucosides (heart poisons) in the polka dot moth, *Syntomeida epilais* Walk. (Ctenuchidae : Lep.) with some observations on the toxic qualities of *Amata (= Syntomis) phegea. Proc. R. Soc.* (B), 183 : 227-247 ; London.

ROTHSCHILD, M., B. P. MOORE & W. G. BROWN (1984) : Pyrazines as warning odour components in the monarch butterfly, *Danaus plexippus*, and in the

moths of the genera *Zygaena* and *Amata* (Lepidoptera). *Biol. J. Linn. Soc.*, 23 : 375-380 ; London.

SBORDONI, V. & L. BULLINI (1971) : Further observations on mimicry in *Zygaena ephialtes* (Lepidoptera, Zygaenidae). *Fragm. Ent.*, **8** : 49-56 ; Rome.

SBORDONI, V., L. BULLINI, G. SCARPELLI, S. FORESTIERO & M. RAMPINI (1979) : Mimicry in the burnet moth *Zygaena ephialtes* : population studies and evidence of a Batesian-Müllerian situation. *Ecol. Entomol.*, 4 : 83-93 ; Oxford.

SCHULER, W. (1980) : Zum Meidenlernen ungenießbarer Beute bei Vögeln : Der Einfluß der Faktoren Umlernen, neue Alternativbeute und Ähnlichkeit der Alternativbeute. *Z. Tierpsychol.*, 54 : 105-143 ; Berlin.

SCHULER, W. (1982) : Zur Funktion von Warnfarben : Die Reaktion junger Stare auf wespenähnlich gelb-schwarze Attrappen. *Z. Tierpsychol.*, 58 : 66-78 ; Berlin.

SEVASTOPOULO, D. G. (1941) : The early stages of Indian Lepidoptera VI. *J. Bombay Nat. Hist. Soc.*, 42 : 283-294 ; Bombay.

SEVASTOPOULO, D. G. (1942) : The early stages of Indian Lepidoptera X. *J. Bombay Nat. Hist. Soc.*, 43 : 409-415 ; Bombay.

TURNER, J. R. G. (1971) : Studies of Müllerian mimicry and its evolution in burnet moths and heliconiid butterflies. In : CREED, R. (ed.) : Ecological genetics and evolution : 224-260 ; Blackwell Scientific Publications, Oxford & Edinburgh.

Nota lepid. 10 (3) : 193-196 ; 31.X.1987 ISSN 0342-7536

Book reviews — Buchbesprechungen — Analyses

O. KUDRNA : Grundlagen zu einem Artenschutzprogramm für die Tagschmetterlingsfauna von Bayern und Analyse der Schutzproblematik in der Bundesrepublik Deutschland. *Nachr. ent. Ver. Apollo, Frankfurt, Suppl.* 6 : 1-90, 1986. DM 20. ISSN.-0723-9920.

Die Tatsache, dass auch die wirbellosen Tiere durch die sich verschlechternden Umweltbedingungen äusserst stark betroffen sind, hat bisher im europäischen Raume nicht zu grösseren und koordinierten Schutzbemühungen geführt. Die Einsicht, dass an diesem Zustand nicht nur die auf diesem Gebiete zuwenig aktiven Behörden Schuld tragen, sondern ganz wesentlich auch wir Naturfreunde und unsere Gesellschaften, beginnt sich erst langsam durchzusetzen. Insbesondere die Entomologen, die grösste Gruppe der Wirbellosenfreunde, haben im Vergleich etwa zu den Ornithologen einen grossen Rückstand aufzuholen. Was fehlt, sind gesicherte Daten über den Rückgang der Wirbellosen und die Gründe für diese Entwicklung. Das Problem einen wirksamen Schutz unserer mitteleuropäischen Kleinlebewelt durchzuführen scheint allerdings angesichts der riesigen Artenzahl kaum überwindlich. Es kann also nicht darum gehen, jede einzelne Wirbellosen — oder auch "nur" Insektenart — zu schützen, sondern es muss versucht werden, durch gezielte Auswahl arten- und spezialitätenreicher Standorte eine möglichst grosse Vielfalt in ein Zeitalter mit sanfteren Technologien und umweltgerechterer Resourcenbewirtschaftung zu retten. Was wir also benötigen, ist eine Gruppe von Wirbellosen, die nicht zu artenreich und systematisch gut bekannt sowie relativ leicht zu beobachten und ökologisch vielfältig ist. KUDRNA schlägt in seiner Arbeit die Tagschmetterlinge als sehr günstige Indikatorgruppe für terrestrische Lebensräume vor und kann für seine Wahl ausgezeichnete Gründe anführen. Er schätzt, dass bei erfolgreichem Schutz von ca 200 Tagfalterarten bis zu 30'000 weiteren Insektenarten allein durch den nötigen Biotopschutz geholfen werden könnte. Der Autor präsentiert ein umfangreiches und wohlbegründetes Aktionsprogramm für den Freistaat Bayern, ein Gebiet mit vielfältigen Lebensräumen.

Grundlage für das von KUDRNA vorgeschlagene Schutzprogramm bildet die sorgfältige Erforschung und Erfassung der Tagschmetterlinge Bayerns. Diese aufwendige Arbeit ist dringend nötig, um die Schutzbemühungen in sinnvolle Bahnen lenken zu können. Bei dieser Grundlagenarbeit ist die Tätigkeit der Liebhaberentomologen von ausschlaggebender Bedeutung. Es wird nur mit Hilfe dieser "Fronarbeit" möglich sein, genügend Feindaten zu sammeln um, wie etwa die Ornithologen, die Behörden und interessierten Verbände mit gesicherten Befunden versorgen zu können. Sobald der Vorschlag KUDRNA's in die Praxis umgesetzt werden kann, wird der längerfristige Erfolg wiederum von der Mitarbeit der gleichen Personengruppe bei der Überwachung und Erfolgskontrolle der Schutzbemühungen abhängen.

Dieser Rezensent erachtet das von KUDRNA vorgeschlagene Programm als potentiell sehr gut geeignet um in einem klar umschriebenen Gebiet die weitere Verarmung der

genetischen Vielfalt zu bremsen. Es ist äusserst wünschenswert, dass dieses Aktionsprogramm nicht bloss eine akademische Abhandlung bleibt, sondern die Chance erhält in der Praxis erprobt werden zu können. Der Freistaat Bayern könnte in Mitteleuropa zu einem Modelfall werden und die dort gesammelten Erfahrungen Grundlagen bilden für weitere ähnliche Projekte.

Von besonderem Interesse scheint mir auch der von KUDRNA vorgeschlagene Chorologie-Index.

Kritik möchte dieser Rezensent nur in einem, für das Gesamtvorhaben unwesentlichen Punkte üben. Es scheint mir unnötig und für den Laien verwirrend, wenn in diesem Werk eine ganze Anzahl äusserst diskutierbare nomenklatorische Änderungen vorgenommen werden. Als willkürlich herausgegriffenes Beispiel diene die Verschmelzung der Gattung *Pontia* mit *Pieris* die auch neuesten Untersuchungen klar widerspricht.

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BRYNER, Rudolf: Dokumentation über den Rückgang der Schmetterlingsfauna in der Region Biel-Seeland-Chasseral. Ergebnisse einer Bestandesaufnahme der Schmetterlinge 1976-1985. Beiträge zum Naturschutz in der Schweiz 9. SBN, Schweizerischer Bund für Naturschutz, Basel, Februar 1987. 2., überbearbeitete Fassung, Fr. 9.- plus Porto. Bestellung: SBN, Postfach 73, Basel CH-4020.

Der Schweizerische Bund für Naturschutz (SBN) hat sich entschlossen, Schutzprogramme für die Tagfalter (ab 1983) und für die Libellen (ab 1986) der Schweiz zu lancieren – um endlich einen Anfang zu machen. Als Grundlage für diese Programme ist ein Verbreitungsatlas für die in der Schweiz vorkommenden Arten vorgesehen, und diese Aufgabe wurde dem Centre suisse de cartographie de la faune (CSCF) in Neuenburg/Neuchâtel anvertraut. Ein zweiter Schritt ist die Inventarisierung und der Schutz der wichstigsten Standorte im Gelände, was nur mit der Hilfe von örtlichen Mitarbeitern, welche die Fauna ihrer Region gut kennen, erfolgen kann.

Genau das wurde nun von R. BRYNER, Twann (BE) in seiner „Dokumentation" erreicht. Diesem ausgezeichneten Lepidopteristen und Kenner seiner Region – eines klar umrissenen Gebietes vom Seeland bis zum Chasseral (über die Kantone Bern, Neuenburg/Neuchâtel, Freiburg/Fribourg und Waadt/Vaud verteilt) – ist genau das gelungen: eine praktisch vollständige Bestandesaufnahme der Tagaktiven Schmetterlingsarten dieser Region (d.h. der Rhopaloceren, plus Zygaenidae und 3 Sphingidae-Arten). Die Arbeit von BRYNER veranschaulicht das zunehmende Verschwinden der ihm vertrauten Lebensräume und stellt ganz allgemein Fragen zur Erhaltung der Natur auf.

Die gefällige Broschüre mit 92 Seiten in A4 Format ist rationell in 4 Teilen gegliedert: 1. Problemstellung, 2. Arbeitsmethoden, 3. Die Schmetterlingswelt der Region Biel-Seeland-Chasseral und ihre Gefährdung, 4. Schutz der einheimischen Schmetterlinge.

Der 3. Teil enthält u.a. eine vollständige Liste der 146 tagaktiven Schmetterlinge der Region, mit Erläuterungen. Am wichtigsten ist der Kapitel über den Rückgang der Schmetterlinge mit Listen der ausgestorbenen oder verschollenen Arten (31), mit einigen klaren geographischen Krokis als Beispiel. Dazu noch ein Kapitel über die Rückzugsbiotope, ebenfalls mit sehr guten Krokis (Mt. Vully), über Gefährdungsdisposition der Falterformationen (nach BLAB/KUDRNA 1982) und schliesslich über die Ursachen der Gefährdung.

Der 4. Teil, Schutz der einheimischen Schmetterlinge, besteht aus 3 Kapiteln : 1. Artenschutz oder Biotopschutz, 2. Der Biotopwert : „Biotopwertziffer" nach einem eigenen System festgelegt (o = keine Gefährdung, bis 15 = letzte Populationen scheinbar erloschen nach 1975) ; Auswahl von 29 untersuchten Lebensräume in den 3 Regionen Mittelland, Jurasüdfuss und Jura, mit Artenliste (Beilage) und mittlerem Biotopwert ; Biotopwert-Karte. 3. Massnahmen zur Erhaltung unserer Schmetterlingsfauna, mit Massnahmen-Katalog (*20* Forderungen !), und einem sehr pessimistischen Abschluss-Kapitel : „Naturschutz kontra Land- und Forstwirtschaft ?".

In 8 Beilagen findet man allerlei interessante Angaben und Daten. Z.B. die Definitionen der Falterformationen, der Schadfaktoren und der Verursacher des Schmetterlingsrückgangs nach BLAB/KUDRNA 1982 unverändert, die Definitionen der Gefährdingsgrade nach PRETSCHER und BLAB/KUDRNA, angepasst an die Verhältnisse der behandelten Region, eine Liste der 50 gefährdetsten tagaktiven Schmetterlinge des Untersuchungsgebietes, etc. Abschliessend : Ein sehr reiches Quellenverzeichnis, mit 91 Referenzen.

Die einzigartige grosse Arbeit von BRYNER ist allen Naturschützer und Lokalfaunisten als perfektes Modell für ihre Beobachtungen und Forschungen im Gelände wärmstens empfohlen. Dazu sollte sie auch die Sammler zur Vorsicht animieren, und den Berufsentomologen in den Museen und Instituten wieder Hoffnung auf Nachwuchs an neuen Gelände-Mitarbeitern geben !

E. de Bros

J. A. SCOTT : "The Butterflies of North America". Hardback ca. 19 × 26 cm ; 583 pp., 64 col. pls., 71 figs., numerous unnumbered maps. Stanford University Press, Stanford, 1986. Price $ 50,-.

It is more than ten years since HOWE's "Butterflies of North America" replaced the long outdated HOLLAND's butterfly book upon which it must have been modelled. SCOTT's book constitutes a different type of publication – a natural history of North American butterflies, as the subtitle tells us (it certainly is no field guide, as the same subtitle claims it to be). The affinities between the Palaearctic and Nearctic faunas are well known ; SCOTT's publication is therefore of exceptional importance to all European lepidopterists and deserves a full review.

The contents of SCOTT's impressive book includes the following chapters and topics :

- Biology and ecology (over 100 pages ; probably the best account ever written on butterfly morphology and evolution by a single author in one book ; further topics are biology, behaviour, physiology, genetics, variation etc.).

- Identification of eggs, larvae, pupae and adults (some 50 pages of useful keys enabling one to identify for instance first instar larvae down to tribes, a unique feature of this book).
- Monographs and distribution maps of all 679 American butterfly species recognized, each monograph consisting of a brief diagnosis (incl. identification of subspecies recognized), information on species' habitat, description of early stages (only a few illustrations are included), distribution, behaviour, voltinism, host plants and occasionally other topics.
- 64 colour plates depicting both set and live adults, some eggs, larvae and pupae, all based (unlike HOWE's book) on colour photographs.
- Checklists of species inhabiting the "remote islands" either politically or geographically related to North America (Iceland, Greenland, Bermuda and Hawaii).
- Methods of the study of butterflies (a modern account most useful to all students of European butterflies).
- Bibliography, hostplant catalogue, glossary (most useful to all European lepidopterists) and an index close the book.

All colour plates are based on photographs and show clearly both the advantages and disadvantages of colour photography as a method of illustration, like HOWE's book shows the advantages and disadvantages of water colours or other forms of painting and drawing. Bearing in mind the price of this book and the number of colour plates, a critique that they could have been better produced, would be unfair (and they are not bad, although they appear somewhat inconsistent and do not "impress" at the first glance).

It is not surprising that the author left out synonymic lists : the existence of the acknowledged "MILLER & BROWN Catalogue" makes this unnecessary. Nonetheless, it is difficult to justify the omission of all authors' names which customarily follow species-group names in the headlines and where the name is used for the first time. It is difficult to believe that a trained acknowledged taxonomist has made this choice of his own will. (This is my only major point of criticism !). The species/subspecies concept follows roughly HENNIG's school : closely related allopatric morphospecies are treated as subspecies of the nomenclaturally oldest taxon which provides the valid name of the species. There are still many supporters of this concept, which seems to be utilized consistently in this book. The misapplication of the term "field guide" has now become such a common abuse of the "trade description act" that it is hardly worth a special reference !

All in all, this is an interesting book at a refreshingly inexpensive price ; it should find its way into the libraries of all lepidopterists taking the study of butterflies seriously. Attentive reading of general chapters and particularly of the glossary could prevent the use of confusing terminology which one meets time and again in European lepidopterological journals suffering from the lack of good editing. It is certainly sad to observe that there is no corresponding book on European butterflies, nor is there a modern checklist of Palaearctic butterflies corresponding to the Nearctic one mentioned above.

O. Kudrna

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Assitant Editors : Dr. Hansjürg Geiger (Bern, CH), Steven Whitebread (Magden, CH).

Contents – Inhalt – Sommaire

Editorial 198
GOATER, B. : In Memoriam John HEATH (1922-1987) 200
HERRMANN, R. : *Dahlica marmorella* sp. n. – eine neue Psychide aus Italien (Psychidae) 203
HESSELBARTH, G. : Morphologische und ökologische Daten zu den präimaginalen Stadien einiger Arten der Gattung *Hyponephele* MUSCHAMP, 1915 (Satyridae) 209
JORDANO BARBUDO, D., J. RODRIGUEZ GONZÁLEZ & J. FERNÁNDEZ HAEGER : *Capparis spinosa* (Capparidaceae) : an oviposition substrate for *Lampides boeticus* LINNAEUS, in southern Spain (Lycaenidae) 218
SATTLER, K. : The systematic status of the genera *Ilseopsis* POVOLNÝ, 1965, and *Empista* POVOLNÝ, 1968 (Gelechiidae : Gnorimoschemini) 224
TREMEWAN, W. G. : The problem of infrasubspecific names in some groups of Lepidoptera 236
WEIDENHOFFER, Z. & W. ECKWEILER : Notes on the status of *Armenia hyrcanica* (RILEY, 1939) (Lycaenidae) 241
Book reviews – Buchbesprechungen – Analyses 247
VI. European Congress of Lepidopterology 202
VI. Europäischer Kongress für Lepidopterologie 217
VIème Congrès Européen de Lépidoptérologie 248
Corrigendum 223
Memorandum 249
Vol. 10 – 1987 : Contents – Inhalt – Sommaire 250
Neue Taxa in Vol. 10 beschrieben – New taxa described in Vol. 10 – Nouveaux taxa décrits dans le Vol. 10 252

Editorial

In order to make "NOTA lepidopterologica" more attractive, the editors would like to introduce the following new items :

1. Invited review articles : We will be asking acknowledged experts (amateurs as well as professionals) to write articles summarising their spcial field of interest. We hope thereby to be able to offer more papers of general interest as well as the more specialised research articles.
2. A new section entitled "Letters to the editors" will be introduced, to enable readers to present their views on published articles or other points of interest. If a letter criticizes a published article, then the author(s) of the article concerned will be given the opportunity to answer the criticism in the same issue of "NOTA". "Letters to the editors" should be kept as short as possible and the editors reserve the right to shorten such letters.
3. A further section to be introduced will be "Field notes". This should enable mainly the amateur to present his observations to a wider circle of lepidopterists. Such notes should be a maximum of one to two typewritten pages and should be devoted to unusual observations (interesting behaviour, extensions of range, species lists from interesting localities etc.).

Editorial

Um die Attraktivität von „NOTA lepidopterologica" zu steigern, möchte die Redaktion folgende Neuerungen einführen :

1. Eingeladene Übersichtspublikationen : Wir werden in naher Zukunft ausgewiesene Fachleute (Amateure wie professionelle Entomologen) bitten, uns einen zusammenfassenden Übersichtsartikel über ihr Spezialgebiet zu schreiben. Wir erhoffen dadurch neben den oft recht speziellen Forschungsartikel vermehrt Publikationen von allgemeinerem Interesse drucken zu können.
2. Nach Bedarf soll in „NOTA" eine neue Rubrik mit dem Titel „Briefe an die Redaktion" eröffnet werden. In dieser Rubrik können die Leser zu publizierten Artikeln oder auch anderen Ereignissen Stellung beziehen. Sofern die Briefe eine Kritik von Veröffentlichungen enthält, wird dem/den Autoren des kritisierten Artikels in der gleichen Ausgabe von „NOTA" Gelegenheit zur Erwiderung gegeben. „Briefe an die Redaktion"

sollen möglichst kurz gehalten werden und die Redaktion behält sich das Recht auf Kürzungen vor.

3. Eine weitere Rubrik „Kurze Exkursionsberichte", die ebenfalls neu geschaffen wird, soll es vor allem auch den Amateuren unter unseren Lesern ermöglichen ihre Beobachtungen einem grösseren Kreis vorzustellen. Solche Exkursionsberichte sollen nicht länger als ein bis zwei Schreibmaschinenseite sein und nicht alltägliche Beobachtungen (interessante Verhaltensweisen, Arealausweitungen, kurze Faunenlisten aus interessanten Gebieten etc.) enthalten.

Éditorial

En vue d'accroître encore l'attrait de Nota lepid. pour ses lecteurs, la Rédaction se propose d'introduire les nouveautés suivantes :

1. Publications invitées : Dans un proche avenir, nous inviterons des connaisseurs éprouvés – tant amateurs que professionnels – à écrire pour nous des articles «vue d'ensemble» sur leur spécialité. Nous aimerions parvenir ainsi à publier à côté des articles scientifiques, souvent très spécialisés, davantage de travaux d'intérêt général.
2. Selon les besoins, nous ouvrirons dans Nota lepid. une nouvelle rubrique sous le titre «Lettres à la Rédaction», permettant à nos lecteurs de se prononcer sur des articles de Nota lepid. ou sur d'autres faits d'actualité. Si ces lettres comportent une critique envers telle ou telle publication, nous donnerons à l'auteur (aux auteurs) de celle-ci la possibilité de répliquer dans le même numéro de Nota lepid. Ces lettres à la Rédaction devront être aussi concises que possible, et la Rédaction se réserve le droit de procéder à des réductions.
3. Une autre nouvelle rubrique : «Excursions en bref» a pour but de permettre notamment aux amateurs parmi nos lecteurs de présenter leurs observations à un plus grand nombre d'intéressés. Ces rapports d'excursion ne devront pas dépasser une à deux pages dactylographiées et seront consacrés à des observations qui sortent de l'ordinaire : comportements curieux, extensions de l'aire de répartition, brèves listes d'espèces pour certaines régions ou biotopes intéressants, etc.

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In Memoriam
John HEATH (1922-1987) (*)

Barry GOATER

22 Reddings Avenue, Bushey, Herts. WD2 3PB, U.K.

John HEATH died on 6 July 1987 at the age of 65. He was one of the founder Members of SEL, on 19 September 1976, and was our vice-President from that time until 1986. During that period he served the Society with devotion : in addition to organising the Third SEL Congress in Cambridge in 1982 and making it a memorable occasion, he was responsible for the finances of the British membership, from the collection of subscriptions to their use in paying for the production of our Bibliographia.

(*) A full list of the publications of John HEATH will appear in a future issue of *Nota lepid.*

John was born at Worcester in 1922, but educated at King Edward VI School, Southampton, where he was taught French by that eminent Hampshire entomologist, William FASSNIDGE. According to John, FASSNIDGE once remarked that although his success in turning him into a French scholar appeared to have been limited, he had nevertheless produced "not a bad" entomologist ! It is certain that John's interest in entomology, and Lepidoptera in particular, began at school, and the fact that his first published note, at the age of 18, was on one of the Psychidae is an indication of FASSNIDGE's influence, for it is rare for a teenager to get beyond the butterflies and larger moths without a mentor.

During the War, John found himself working with electronic equipment in the Royal Electrical and Mechanical Engineers (REME), and later in life his familiarity with such equipment resulted in his easy mastery of data processing at the Biological Records Centre where he began to make his name among entomologists. In the meantime the informal credentials he had picked up in entomology and electronics led to successive appointments first with the Biological Research Department of Pest Control near Cambridge, with a year in Southern Rhodesia (Zimbabwe) and then at Merlewood, the Nature Conservancy Research Station in Cumbria, where he did good work for the next 14 years, not only with Lepidoptera but with other invertebrates. He developed a special interest for the Micropterygidae, and it is in regard to this group that John made his greatest impact as a scientific lepidopterist, indeed a world authority.

John made a contribution to practical collecting when he designed a small, portable, but highly effective moth trap which uses an actinic tube powered by a battery and bears his name – the Heath trap.

In 1967, John set up the Insect Distribution Maps Scheme at the Biological Records Centre at Monk's Wood, where he remained until retirement in 1982 as head of the Centre. From the mapping scheme was born his most ambitious project, the 11-volume treatise on "The Moths & Butterflies of Great Britain & Ireland". Despite setbacks that would have deterred a lesser man, John's enthusiasm remained undiminished. He withstood the occasional snarls of his authors, this writer included, with tact and good humour that made him such a pleasure to work with... and got him his way in the end ! Alas, John only lived long enough to see four of the volumes published, and those who remain are determined to see the work completed as a memorial to the great man.

Another unfinished project which John helped set up, this time with Professor LECLERCQ of Gembloux in Belgium, is the European Invertebrate Survey, and again the future of the project appears to be in safe hands.

John was made President of the British Entomological and Natural History Society in 1982, an office he filled with distinction, but we like to think that it was his vice-Presidency of SEL that gave him most pride. Our Society has lost one of its pillars, and our members a genial and stalwart friend. To his wife, Joan, who was his constant companion and practical help, and their son Nigel, we offer our sincere condolences while sharing their happy memories of a kind and eminent colleague.

VI. European Congress of Lepidopterology
San Remo 5-9 April 1988

The Societas Europaea Lepidopterologica (SEL) kindly invites all lepidopterists to attend the VI. European Congress of Lepidopterology in San Remo from Tuesday 5th - Saturday 9th April 1988.

Main topics are :

- Biochemical and ecological adaptations in Lepidoptera.
- Bionomics of endangered species.
- Genetical and cladistical approaches to the phylogeny of butterflies.

For more information please contact the Congress Secretary : Prof. E. Balletto, Dipartimento di Biologia animale, Via Academia Albertina 17, I-10123 Torino (Italy).

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Dahlica marmorella sp. n. – eine neue Psychide aus Italien (Lepidoptera : Psychidae)

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Zusammenfassung

In den Jahren 1983 und 1985 konnte in der nördlichen Toscana, Italien eine neue Art des Genus *Dahlica* Enderlein, 1912 entdeckt werden, die in der vorliegenden Arbeit beschrieben wird. Im Vergleich mit den nahestehenden Arten konnten signifikante und konstante Unterscheidungsmerkmale festgestellt werden.

Summary

Dahlica marmorella sp. nov. is described from material collected in northern Toscana, Italy in 1983 and 1985. The new species belongs to the broad-scaled species group and is compared with *D. dorotheae* Herrmann from S. France, *D. larella* Chrétien from Spain and *D. achajensis* Sieder from Greece. It is most similar to *D. dorotheae*, from which it differs mainly by a significantly higher genital index of the male.

Während zwei naturwissenschaftlichen Reisen in den Jahren 1983 und 1985 in die höheren Bergregionen der Alpi Apuane, im nördlichen Teil der Toscana gelegen, wurden im Gebiet der bekannten Marmorlagerstätten, etwa 25 km östlich der Küstenstadt Massa, an marmorhaltigen Felsen und Gemäuern *Dahlica*-Säcke einer neuen Art eingetragen. An den Fundstellen, in allernächster Nähe des abgelegenen Bergdörfchens Arni, in Höhen zwischen 800 und 1000 m NN, waren die Säckchen an verschiedenen Stellen, zum Teil in großer Anzahl zu finden.

Als Nahrung der Raupen kommen auch bei dieser Art Steinflechten und Moose in Betracht. Die Raupen spinnen sich nach der Überwinterung im April an den Felsen an. Im Mai schlüpfen dann die Imagines. Die Schlüpfzeiten sind wie auch bei den anderen Spezies der Gattung. In den Abend- und Nachtstunden entwickeln sich die Männchen und im ersten Morgenlicht die Weibchen. Kurz danach findet dann der Hauptpaarungsflug statt.

Neben dieser *Dahlica* konnten an den Felsen noch Raupen und Säcke der Psychiden *Eumasia parietariella* H.-S., *Bruandia* spec. ?, *Psyche crassiorella* Brd. und *Taleporia tubulosa* Retz. in Anzahl nachgewiesen werden.

Diese neue besonders schöngezeichnete Psychide soll nach dem Gestein, auf dem sie siedelt, beschrieben werden.

Dahlica marmorella **sp. nov.**

Holotypus ♂: Italien, Toscana, Alpi Apuane, Arni, 800-900 m NN, 6.-20.5.1985 e.p.

Allotypus ♀: Italien, Toscana, Alpi Apuane, Arni, 800-900 m NN, 6.-20.5.1985 e.p. (Beide in coll. Landessammlungen für Naturkunde in Karlsruhe).

Paratypen: 47 ♂♂, 60 ♂♂ Säcke und 50 ♀♀ mit den zugehörigen Säcken vom Fundort Arni/Alpi Apuane, ex. pupa, in coll. HERRMANN. Die Weibchen sind in 60% Alkohol konserviert.

Diagnose

MÄNNCHEN:

Kopf und Augen schwarz. Kopf- und Rückenbehaarung schütter und rein weiß gefärbt. Fühler mit 26-29 Geiselgliedern. Vordertibia ohne Epiphysis. Vorderflügel: Länge, 4,7-6,3 mm, Mittelwert 5,9 mm (n = 20); Expansion, 9,5-12,8 mm, Mittelwert 11,8 mm (n = 20); schmal mit stumpfem Apex und schwach eingedrücktem Vorderrand; auffallend kontrastreich gegittert mit glänzenden weißen und dunkelgrau gefärbten Flecken. Saumpunkte, Diskoidal- und Innenrandfleck meist vorhanden. Im apikalen Teil der Vorderflügel Deckschuppen der Breitenklasse III-VI, am häufigsten Typ IV-V (Methode nach SAUTER, 1956), grobzähnig (2-3 zackig) oder feingezähnt (4-6 zackig). Vorderflügelgeäder: Bei 30 untersuchten Vorderflügel entsprangen die Adern m2 und m3 meist aus einem Punkt (13) oder waren kurzgestielt (11). Bei 6 Flügeln waren m2 und m3 getrennt. Anhangzelle meist vorhanden. Von 32 untersuchten Flügeln hatten nur 10 keine Anhangzelle. Hinterflügel: Einfarbig weißgrau und durch spärliche Beschuppung hyalin, mit langen weißglänzenden Fransen. Die Adern m2 und m3 in der Regel kurzgestielt. Genitalien vom typischen *Dahlica*-Bau. Der Genitalindex beträgt 0,96-1,10, im Mittel 1,02 (n = 10).

WEIBCHEN:

Das flügellose Weibchen ist graugelb gefärbt, mit schwarzem Kopf und schwarzgrau gefärbten Sterniten und Tergiten. Die Sternite waren, mit Ausnahme des Siebten, bei allen untersuchten Weibchen median unterbrochen. Afterwollhaare silbrigweiß glänzend und ungeknöpft. Anzahl der Fühlerglieder 11-14 im Mittel 13 (n = 10). Tarsus mit 3 oder 4 Gliedern und nicht selten mit Fusionen. Vordertibien dornenlos. Mitteltibien meist mit

Abb. 1. *Dahlica marmorella* sp. nov., kopulierendes Männchen. Italien, Toscana, Alpi Apuane, Arni, 800-1000 m NN. 6.-20.5.1985 e.p. Foto : R. HERRMANN.

Abb. 2. *Dahlica marmorella* sp. nov., lockendes Weibchen. Angaben wie bei Abb. 1.

reduzierten oder gänzlich fehlenden Endspornen. Die Hintertibien ohne Mittelsporne. Endsporne meistens vorhanden.

Postvaginalplatte bei Vergrößerung gut erkennbar (Abb. 3). Im vorderen Teil stärker sklerotisiert. Dornen lang, schmal und zugespitzt. Zwischen dem schmalen und leicht gebogenen Bursabogen und der Postvaginalplatte eine dornenfreie Zone.

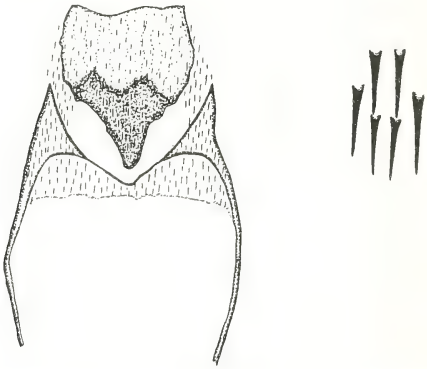

Abb. 3. *Dahlica marmorella* sp. nov., Genitalplatte des Weibchens von ventral. Rechts: Dornen des Dorsalfeldes.

Bei drei unbefruchteten Weibchen wurden durch Überprüfung des Eivorrats 41, 43 und 65 Eier gezählt.

Nach dem Schlüpfen der Weibchen sind die Puppenhüllen auffallend stark gekrümmt. Die Fühlerscheiden der Puppe sind etwa gleichlang wie die Beinscheiden (n = 40). (Methode nach HÄTTENSCHWILER, 1977).

SÄCKE:

Die dreikantigen männlichen und weiblichen Säcke sind hellgrau bis schwarz gefärbt, mit Erdteilchen, Marmorkörnchen und Kalkstaub belegt und ohne nennenswerten Geschlechtsdimorphismus. Länge der Säcke 5,0-7,0 mm im Mittel 6,0 mm (n = 40).

Die vorliegende Art wurde mit den nahestehenden und verwandten Arten *Dahlica dorotheae* (HERRMANN, 1981), *Dahlica larella* (CHRÉTIEN, 1906) und *Dahlica achajensis* (SIEDER, 1966) verglichen (Tabelle 1).

Tabelle 1
Zusammenstellung wichtiger Unterscheidungsmerkmale von *Dahlica marmorella* sp. nov., *D. dorotheae* (HERRMANN, 1981), *D. larella* (CHRÉTIEN, 1906), Angaben nach SAUTER, 1958 und HATTENSCHWILER, 1981, und *D. achajensis* (SIEDER, 1966), Angaben nach SIEDER, 1966.

	marmorella	*dorotheae*	*larella*	*achajensis*
MÄNNCHEN				
Vfl-Spannweite	9,5-12,8 mm	9,5-12,7 mm	ca. 12,5 mm	11,2-12,9 mm
Mittel	11,8 mm	11,5 mm		12,0 mm
Schuppenbreite der Vfl	III-VI	V-VI	IV	IV-V
Genitalindex :	0,96-1,10	0,68-0,88	1,08	0,98-1,05
Mittel	1,02 (n = 10)	0,76 (n = 17)	(n = 1)	1,02 (n = 3)
WEIBCHEN				
Tarsenglieder	3-4	3-4	4	5
Fühlerglieder	11-14	13-16	?	16
Afterwollhaare	einfach	einfach	geknöpft	?

Diskussion

Dahlica marmorella gehört in die Gruppe der breitschuppigen Arten. Signifikante Artunterschiede zu *Dahlica larella* (CHRÉTIEN, 1906), bisher bekannt nur aus der Sierra de Guadarrama (Spanien), sind vor allem bei den Weibchen zu finden. Bei *larella* ist die weibliche Postvaginalplatte nur schwach sklerotisiert. Die Afterwollhaare sind im Gegensatz zu *marmorella* geknöpft. Darüberhinaus ist außerdem der stark abweichende Sack von *larella*, in seiner breiten und kurzen Form, ein wesentliches Trennungsmerkmal zu den nahe verwandten Arten. Von *D. dorotheae* (HERRMANN, 1981) verbreitet in den Provenzialischen Alpen (Frankreich), der *marmorella* am ähnlichsten ist, ist sie durch den deutlich höheren männlichen Genitalindex, die lichtere Beschuppung, sowie durch die hellere Grundfarbe des Männchens und klarer hervortretenden Zeichnungsstrukturen der männlichen Vfl. zu trennen. Gegenüber *D. achajensis* (SIEDER, 1966), bekannt vom Peloponnes (Griechenland), unterscheidet sie sich durch die weiße Grundfarbe der männlichen Flügel und vor allem durch die 3-4 gliedrigen Tarsen der weiblichen Beine. Die Weibchen von *achajensis* besitzen neben einem 5-gliedrigen Tarsus auch eine höhere Fühlergliederzahl.

REBEL beschrieb 1918 anhand eines von MANN eingebrachten Männchens, mit der Bezeichnung „Sizilien (MANN) 1858", *Solenobia siculella*. Aus der Urbeschreibung ist zu entnehmen, daß aber ein Irrtum über die Herkunft des Stückes nicht ganz ausgeschlossen werden kann. Die Vorderflügellänge und Expansion des Falters von 7,2 bzw. 14 mm, bei *marmorella* 5,9 und 11,8 mm als mittlere Werte, schließen auf eine größere Art. REBEL schreibt weiter, daß die viel gröbere weiße Fleckung der Vfl. mit keiner ihm damals

bekannten Solenobienart vergleichbar gewesen sei. Über Neufunde von *siculella* wurde seither nichts mehr bekannt. Auch können zum Verbleib des REBEL'schen Männchens keine Angaben gemacht werden. Das fragliche Männchen befindet sich nicht im Naturhistorischen Museum Wien. (Briefliche Mitteilung von WEIDLICH, Halle).

Eine Identität dieses sizilianischen Stückes mit *marmorella* kann ausgeschlossen werden. Dafür sprechen die Angaben in der Urbeschreibung und die geographische Verbreitung, sowie das isolierte reliktartige Vorkommen von *marmorella* in den Hochlagen des nördlichen Apenninengebirges.

Literatur

HÄTTENSCHWILER, P., 1977. Neue Merkmale als Bestimmungshilfe bei Psychiden und Beschreibung von drei neuen *Solenobia* DUP. Arten (Psychidae, Lepidoptera). *Mitt. ent. Ges. Basel* N.F. 27 : 33-60.

HÄTTENSCHWILER, P., 1981. Eine neue *Dahlica* (= *Solenobia* auct.) aus Spanien (Lepidoptera, Psychidae). *Nota lepid.* 4 : 21-26.

HERRMANN, R., 1981. Eine neue Psychide aus der Umgebung von Digne (Basses-Alpes), (Lepidoptera, Psychidae). *Atalanta* 12 : 133-138.

REBEL, H., 1918. Zur Kenntnis palaearktischer Talaeporiiden. *Dt. Ent. Z. „Iris"* 32 : 95-112.

SAUTER, W., 1956. Morphologie und Systematik der Schweizerischen *Solenobia*-Arten (Lep. Psychidae). *Rev. Suisse Zoologie* 63 : 451-550.

SAUTER, W., 1958. Zur Kenntnis von *Solenobia fumosella* HEIN. und *S. larella* CHRÉT. (Lep. Psychidae). *Mitt. schweiz. ent. Ges.* 30 : 328-332.

SIEDER, L., 1966. Eine neue Psychide (Lepidoptera Psychidae) aus dem Peloponnes (Griechenland). *Solenobia achajensis* nov. spec. *Z. wien. ent. Ges.* 51 : 97-100.

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Morphologische und ökologische Daten zu den präimaginalen Stadien einiger Arten der Gattung *Hyponephele* MUSCHAMP, 1915 (Lepidoptera : Satyridae)

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Summary

The early stages of *Hyponephele lycaon* KÜHN, *kocaki* ECKWEILER, *lupina* COSTA und *naricina* STAUDINGER are compared. Particularly the last two larval stages and the pupae offer useful identification characters. The selected characters show striking similarities between *lycaon* and *kocaki*, while *lupina* seems to take a position between the *lycaon-kocaki*-group and *naricina*. Their ecological requirements are different : *H. lycaon* is the most flexible species, *lupina* prefers dry, hot and bushy biotopes, *kocaki* and *naricina* are apparently strictly bound to hot rocky slopes with little vegetation.

Zusammenfassung

Die Entwicklungsstadien von *Hyponephele lycaon* KÜHN, *kocaki* ECKWEILER, *lupina* COSTA und *naricina* STAUDINGER werden miteinander verglichen. Besonders die letzten beiden Raupenstadien und die Puppen bieten brauchbare Möglichkeiten für eine artliche Differenzierung. Die ausgewählten präimaginalen Merkmale zeigen bei *lycaon* und *kocaki* auffallende Ähnlichkeiten, während *lupina* eine Art Mittelstellung zwischen der *lycaon-kocaki*-Gruppe und *naricina* einzunehmen scheint. Die ökologischen Ansprüche sind unterschiedlich : *H. lycaon* zeigt die größte Flexibilität, *lupina* bevorzugt trockene, heiße und mit Büschen bestandene Biotope, *kocaki* und *naricina* sind offenbar an bestimmte Umweltbedingungen eng gebunden.

Zu den ersten Ständen von Arten der Gattung *Hyponephele* MUSCHAMP, 1915 sind mir bisher nur Angaben über *H. lycaon* bekanntgeworden. Die nachstehenden Daten, die sich sämtliche auf Eizuchten anatolischer Tiere beziehen, sollen dazu beitragen, den Informationsstand zu erweitern, zumal auch die Entwicklungsstadien für eine taxonomische Beurteilung und für phylogenetische Aspekte von großer Bedeutung sind. Bisher konnten Eiablagen von *H. lycaon, kocaki, lupina, wagneri* und *naricina* erreicht werden. Da aber die Raupen von *H. wagneri* HERRICH-SCHÄFFER bereits in der ersten Häutungsphase eingingen, wird diese Art hier nicht berücksichtigt.

Die angeführten Arten wurden unter den klimatischen Bedingungen Nordwestdeutschlands anfangs im ungeheizten Zimmer gehalten, während der Winterdiapause im Kühlschrank Temperaturen von 5 bis 6°C ausgesetzt und danach im geheizten Zimmer an *Poa annua* zur Imago durchgezüchtet.

1. ***Hyponephele lycaon*** (KÜHN, 1774)

Die Eier europäischer *lycaon* wurden von GILLMER (1900 : 84), von SPULER (1902 : 46) und von DÖRING (1955 : 83) beschrieben, von DÖRING (1955, Tafel 12) auch bildlich dargestellt. Sie sind anfangs gelblich gefärbt und nehmen vor dem Schlupf eine rötliche Tönung an. Die Zahl der Längsrippen wurde von GILLMER mit 19, von DÖRING mit 19 bis 20 angegeben. Bei Eiern, die Weibchen vom Güzeldere-Paß (Provinz Van) ablegten, stellte ich 22 bis 24 solcher Längsleisten fest.

Bei meinen Aufzuchten schlüpften die Räupchen, deren Ausgangsmaterial aus verschiedenen kleinasiatischen Gegenden stammte, nach 12 bis 15 Tagen. Sie hatten zunächst braune Köpfe, einen hellbraunen Körper und ungleich breite, dunkelbraune Längslinien. Nach der ersten Häutung wurden Kopfkapsel, Körper und Rückenstreifen grün, die übrigen Längslinien weißlich. Diese Zeichnungs- und Färbungselemente blieben bis zum Ende der 3. Häutungsphase (L 3) bestehen. Mit Beginn des vorletzten Entwick-

Abb. 1. Raupe von *H. lycaon*, Länge 30 mm.

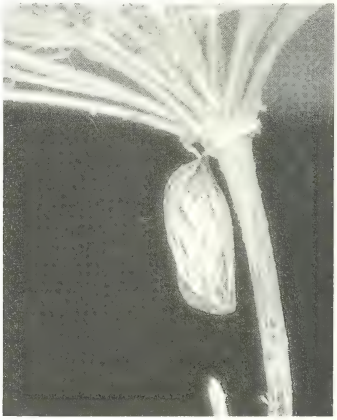

Abb. 2. Puppe von *H. lycaon*, Länge 12 mm.

lungsstadiums wurden an der Kopfkapsel zwei seitliche Wülste sichtbar, die den Kopf aus frontaler Sicht herzförmig erscheinen ließen. Außerdem traten an den Seiten dieser Aufwölbungen rote oder purpurfarbene Längsstriche hervor, die, von einem weißen breiten Hof umrandet, der Kopfkapsel ein maskenförmiges Aussehen gaben (Abb. 1). Gleichzeitig hoben sich die nun dunkelgrüne Dorsale sowie die weißlichen Lateralen schärfer ab, und der breite basale Streifen war nun rot/weiß oder purpurn/weiß, gelegentlich auch gelb/weiß (vgl. Bodi 1985, Tafel 7, Abb. 60) gefärbt. In einigen Fällen schien dieses basale Band ganz weiß zu sein, aber bei genauer Betrachtung war es zum Rücken doch stets durch eine feine, rötliche Linie gegen die Grundfarbe abgegrenzt. Die aus Anatolien stammenden *lycaon*-Raupen erreichten eine Körperlänge von 30 mm. Zur Verpuppung zogen sie einige Grashalme zusammen und legten ein kleines, flaches Polster an, in das die Kremasterspitzen einhakten. Die Umwandlung vollzog sich rasch.

Die 11 bis 12 mm langen Stürzpuppen waren grau oder graubraun, manchmal auch graugrün gefärbt. Die dunklen Phänotypen wiesen auf den Flügelscheiden kräftige, schwarze oder schwarzbraune Striche und Flecken auf, die bei den helleren Puppen schwächer ausgeprägt waren (Abb. 2). Völlig zeichnungslose grüne Puppen, wie sie bei Spuler (1902 : 46) neben dunklen Puppenformen erwähnt und von Higgins & Hargreaves (1983 : 225, Fig. 5 b) abgebildet wurden, habe ich bei meinen Aufzuchten nicht erhalten.

2. *Hyponephele kocaki* Eckweiler, 1978

Die weißlichen, nach einigen Tagen trübroten Eier wurden in den Zuchtbehältern meist an noch frische Bestandteile der Nahrungspflanzen der Raupen geheftet. Von Dr. Siepe (Neuss), der eine Parallelzucht, deren Ausgangsmaterial ebenfalls vom Güzeldere-Paß (Provinz Van) stammte, durchführte, und von mir wurden 16 bis 21 Längsrippen mit leitersprossen-ähnlichen Querstrukturen festgestellt. Anders als bei *lycaon* zog sich der Schlüpfvorgang über einen langen Zeitraum, bis zu sieben Wochen, hin.

Die Eiräupchen waren etwas heller als die von *lycaon*, sandfarben mit braunem Kopf und braunroten Rücken-, Seiten- und Fußstreifen. Die mit den Häutungen verbundenen Veränderungen vollzogen sich ähnlich wie bei *lycaon*. Die erwachsenen *kocaki*-Raupen (Abb. 3) wirkten jedoch gedrungener und erreichten im Durchschnitt nur eine Gesamtlänge von 27 mm. Die Delle in der Kopfkapsel war flacher als der herzförmige Einschnitt bei *lycaon*. Sehr häufig war die grüne Grundfarbe der *kocaki*-Raupen in den letzten beiden Häutungsphasen (L 4 und L 5) rot übergossen, und bei diesen Färbungstypen war dann auch der untere Teil des basalen Streifens rosa statt weiß.

Abb. 3. Raupe von *H. kocaki*, Länge 27 mm.

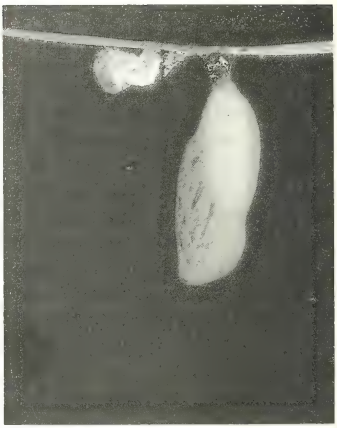

Abb. 4. Puppe von *H. kocaki*, Länge 10 mm.

Der Verpuppungsmodus entsprach dem von *lycaon*, aber die Puppen selbst waren zierlicher und mit 10 mm Länge auch etwas kürzer. Auffällig waren die Färbungs- und Zeichnungsunterschiede zu den anderen *Hyponephele*-Arten: Der Puppenkörper war rötlich gefärbt, die Flügelscheiden aber graugrün oder graublau; ihr Zeichnungsmuster (Abb. 4) glich in der Anlage dem von *lycaon*, bestand aber aus feineren, dunkleren Strichen. In der präpupalen Phase erwiesen sich die *kocaki*-Raupen als sehr empfindlich: Einige von ihnen fielen von den Gespinstpolstern ab, konnten sich aber in den meisten Fällen dennoch in eine normal geformte Puppe verwandeln.

3. ***Hyponephele lupina*** (COSTA, 1834)

Zur Eiablage wurden Weibchen in verschiedenen Jahren aus den Provinzen Nevşehir, Bitlis und Artvin verwendet. Die Tiere legten jeweils immer nur eine kleine Menge von Eiern ab. Die anfangs gelblichen, dann aber schnell zu einer schmutzig-hellbraunen Tönung nachdunkelnden Eier sind etwas größer als die von *lycaon* und an beiden Polen stärker abgeflacht. Sie haben 18 bis 21 Längsrippen, die im unteren Teil in unregelmäßige Erhöhungen übergehen. Die Eidauer betrug zwei Wochen. Die Eiraupen sind denen von *lycaon* ähnlich, haben aber einen dunkleren Kopf und dunklere, gleichbreite Längsstreifen. Die larvale Entwicklung ist ebenfalls mit der von *lycaon* zu

vergleichen, aber der basale Streifen blieb bei meinen Aufzuchten auch in L 4 und L 5 einfarbig gelblich, war also nicht wie bei *kocaki* und *lycaon* zweigeteilt. Der auffallendste Unterschied zu den beiden anderen Arten liegt in der Gestalt der grünen Kopfkapsel, die bei *lupina* zwei spitze, oben rötliche, beborstete Höcker (Abb. 5) trägt, die an ein Gehörn erinnern. An der Seite dieser Höcker verlaufen rote oder braunrote, weiß eingefaßte Striche, die im Vergleich zu den Wangenstrichen bei *lycaon* und *kocaki* schmaler sind. Da die dunkelgrüne Rückenlinie weiß eingerahmt ist, tritt sie deutlich hervor. Die abdominalen Zapfen sind länger als bei *lycaon*, weißlich und nur oberseits hochrot gefärbt. Die hellen Stigmen über der Fußlinie sind wie bei den anderen beiden Arten kaum sichtbar. Auch die *lupina*-Raupen fertigten sich zur Verpuppung ein großräumiges, lockeres, aus unregelmäßigen Polygonalen bestehendes Gewebe an. Die präpupale Phase war kurz.

Die grüne Puppe ist kompakter und etwas länger als die von *lycaon*. Die grünen Flügelscheiden haben undeutliche weiße Striche und einen aufgewölbten, weißen Innenrand. Im geheizten Zimmer betrug die Puppenruhe etwa 4 Wochen.

Abb. 5. Raupe von *H. lupina*, Länge 32 mm.

4. ***Hyponephele naricina*** (STAUDINGER, 1870)

In der Gefangenschaft legten die aus der Umgebung von Van stammenden Weibchen ihre weißlichen, später sandfarben-rötlichen Eier ganz überwie-

gend an anorganische Unterlagen wie Steine, Blumentopfrand oder Nylonbeutel ab. Die Eier hatten 17 Längsrippen. Die Räupchen schlüpften in sehr unregelmäßigen Abständen, teilweise erst nach vier oder mehr Wochen. Die hell-beigen Eiraupen hatten einen braunen Kopf und helle Längsstreifen. Kopf und Körper waren wie bei den anderen Arten mit weißen Börstchen besetzt. Die abdominale Gabel wurde erst nach der Nahrungsaufnahme sichtbar. Die Jungraupen waren im Vergleich zu den anderen von mir aufgezogenen *Hyponephele*-Arten schlanker und gestreckter. Die ausgewachsenen Larven erreichten eine Gesamtlänge von 30 mm (Abb. 6). Die runde, grüne Kopfkapsel und die breiten, leuchtend weißen Seiten- und Fußbänder boten in L 4 und L 5 die markantesten Unterschiede zu den anderen Arten. Ein ganz feiner, kurzer Wangenstrich war mit bloßem Auge kaum zu erkennen. Ohne Anlage eines Gespinstes verwandelten sich die kräftiggrünen Raupen meist in eine Stürzpuppe. Nur einige Larven vollzogen die Verpuppung ohne weitere Vorbereitungen auf dem Erdboden. Dabei wurden, wie bei *kocaki*, weder irgendwelche Deformierungen noch morphologische Unterschiede zu den Hängepuppen festgestellt.

Die Puppe selbst ist grün und bis auf den weißen Innenrand der Flügelscheiden zeichnungslos (Abb. 7). Die Falter schlüpften nach vier Wochen.

Abb. 6. Raupe von *H. naricina*, Länge 29 mm.

Abb. 7. Puppe von *H. naricina*, Länge 14 mm.

Diskussion

Aus den Beobachtungsdaten ist ersichtlich, daß bei diesen vier *Hyponephele*-Arten die Raupen in den beiden letzten Häutungsabschnitten sowie die Puppen die markantesten Differenzierungskriterien bieten :

Art :	Raupen in L4 und L5 :			Puppen :	
	Kopfform	Wangenstrich	Basaler Längsstreifen	Grundfarbe	Flügelscheiden
kocaki	mit flacher Delle	kräftig, breit	rot/weiß oder rot/rosa	rötlich	graublau oder graugrün, deutlich gezeichnet
lycaon	herzförmig	kräftig, breit	rot/weiß oder purpurn/weiß, selten gelb/weiß	braun oder graubraun, selten graugrün	wie die Grundfarbe, stark gezeichnet
lupina	tief eingekerbt	deutlich, schmal	einfarbig gelblich	grün	grün mit schwachen weißen Strichen
naricina	rund	kaum sichtbar	weiß	grün	grün, ungezeichnet, Innenrand weiß

Die weitgehende Übereinstimmung präimaginaler Merkmale bei *kocaki* und *lycaon* kann als Hinweis auf eine relativ junge Artentrennung angesehen werden. Doch auch bei den *lupina*-Raupen lassen die Kopfform, der Wangenstrich, der farbige Basalstreifen, der Verpuppungsmodus und bei der Puppe die – wenn auch nur schwache – Zeichnung der Flügelscheiden Beziehungen zur *kocaki-lycaon*-Gruppe erkennen. Dagegen weist die türkische *naricina*, die Gross 1977 nach Tieren aus der Umgebung von Erzincan als subsp. *naricoides* beschrieb, im Raupen- und Puppenstadium Merkmale auf, die eine frühere Abtrennung vom gemeinsamen Stamm vermuten lassen. Die Kenntnis der ersten Stände der übrigen Arten, die nach der derzeitigen Systematik zum Genus *Hyponephele* gestellt werden, wird zur Gruppierung innerhalb der Gattung beitragen können.

Die ökologischen Ansprüche dieser vier Arten sind unterschiedlich. Am anpassungsfähigsten ist *H. lycaon* ; diese Satyride bewohnt in Eurasien ein ausgedehntes Areal und konnte in jüngster Zeit ihren Siedlungsraum in nordwestlicher Richtung noch ausweiten (De Lattin 1967 : 41). Andererseits hat ihr Verbreitungsgebiet im europäischen Raum durch menschliche Eingriffe in die Landschaft an Geschlossenheit eingebüßt. In der Türkei

behauptet *lycaon* sich noch in höheren Lagen, wo sie stellenweise mit *kocaki* zusammentrifft. In solchen Kohabitationszonen, wie in der Provinz Hakkari (ECKWEILER 1978 : 376) oder im Mengene-Gebirge im Südosten der Provinz Van, erscheint die lokale *kocaki* einige Zeit vor der weitverbreiteten *lycaon*. Am Güzeldere-Paß im Mengene-Gebirge blieben die Imagines von *lycaon* im Bereich der grasigen Hänge, während die Falter von *kocaki* diesen Raum sogar in den heißen Mittagstunden verließen, um sich auf der besonders heißen Teerdecke der Paßstraße niederzulassen.

H. lupina ist in weiten Gebieten Südeuropas bodenständig, zeigt aber ein Bild disjunkter Verbreitung. In Kleinasien habe ich diese xerotherme Art sowohl in Küstennähe als auch noch in Höhenlagen von etwa 2200 m gefunden. Sie bevorzugt Biotope mit Büschen, in deren Schutz sich die Falter auch am Tage lange aufhalten. Ihre relative ökologische Flexibilität kommt auch wohl darin zum Ausdruck, daß die in der Türkei abgelegten Eier selbst unter dem Einfluß des nordwest-deutschen Klimas noch kurzfristig und gleichzeitig die Raupen ergaben, wie sich mehrfach erwies, während der Schlüpfvorgang bei *kocaki* und *naricina* unregelmäßig erfolgte und einen langen Zeitraum in Anspruch nahm. Die vergleichsweise kurze Vegetationsperiode in den Brutbiotopen von *kocaki* und *naricina*, die davon abhängige Entwicklungsgeschwindigkeit der präimaginalen Stadien und die im Vergleich zu anderen Satyriden kurze Flugzeit der Imagines lassen vermuten, daß auch der Schlupf der Raupen dieser beiden Arten in ihren natürlichen Reproduktionsräumen zeitlich begrenzt sein wird.

In der Türkei habe ich *naricina* nur an vegetationsarmen, heißen und steinigen Hängen in 1400 bis 2100 m Meereshöhe angetroffen. Die sehr scheuen Falter setzten sich mit geschlossenen Flügeln so auf den erwärmten Boden, daß die Sonnenstrahlen etwa senkrecht auf eine Flügelseite auftrafen. Mit ihrer unruhig gezeichneten, silbrigen Hinterflügelunterseite sind diese Tiere in ihren Habitaten hervorragend gegen Sicht getarnt. Wenn die *naricina*-Weibchen in der Gefangenschaft ihre Eier an anorganische Stoffe hefteten, so wird dieses Ablageverhalten weitgehend den Möglichkeiten in der Natur entsprechen ; denn die mir bekannten Flugbiotope in den Provinzen Erzincan, Sivas und Van sind zur Flugzeit dieser Art so kahl abgeweidet und von der Sonne so ausgedörrt, daß die Eiraupen in der ersten Zeit nach dem Schlüpfen sich nur unter Steinen verbergen können und sich vor dem Austrocknen durch die Aufnahme von Tau schützen müssen. Die bei den Aufzuchten gemachte Beobachtung, daß die Raupen von *naricina* wie auch die von *kocaki* sich nicht in allen Fällen in eine Hängepuppe verwandelten, sondern sich auch auf dem Boden verpuppen konnten, werte ich nicht als einen artgemäßen alternativen Verpuppungsmodus, sondern als eine Reaktion auf die drastisch veränderten Umweltbedingungen.

Literatur

BODI, E., 1985. Die Raupen der europäischen Tagfalter – Les Chenilles des papillons diurnes européens – The caterpillars of European butterflies. Compiègne.

DÖRING, E., 1955. Zur Morphologie der Schmetterlingseier. Berlin.

ECKWEILER, W., 1978. Eine neue Art der Gattung *Hyponephele* MUSCHAMP aus der Südtürkei (Lep., Satyride). – *Atalanta* (Würzburg) 9 (4a) : 375-379.

GILLMER, M., 1900. Beschreibung von Tagfaltereiern. – *Ent. Z.*, Frankfurt a. M., 14 (11) : 83-84.

GROSS, F. J., 1977. Über *Hyponephele narica* und *H. naricina* und deren Verbreitung in der Türkei (Lep. Satyridae). – *Atalanta* (Würzburg) 8 (2) : 123-125.

HIGGINS, L. & HARGREAVES, B., 1983. The butterflies of Britain and Europe. London.

DE LATTIN, G., 1967. Grundriß der Zoogeographie. Stuttgart.

SPULER, A., 1901-1908. Die Schmetterlinge Europas. Band 1. Stuttgart.

VI. Europäischer Kongress für Lepidopterologie San Remo 5.-9. April 1988

Die Societas Europaea Lepidopterologica (SEL) lädt alle Lepidopterologen zur Teilnahme am VI. Europäischen Kongress für Lepidopterologie in San Remo (Dienstag 5. bis Samstag 9. April 1988) ein.

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Capparis spinosa (Capparidaceae) : an oviposition substrate for *Lampides boeticus* LINNAEUS, in southern Spain (Lepidoptera : Lycaenidae) (*)

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Zusammenfassung

In Süd-Spanien, legt *L. boeticus* im Sommer seine Eier auf *C. spinosa* ab, da wo keine andere Futterpflanzen verfügbar sind. Trotz dem verbreiteten Kannibalismus unter den Raupen dieser Art, haben wir oft Eiablagen in den selben Knospen beobachtet, insbesondere auf Pflanzen in der Blütezeit. Eier wurden in Gruppen von ca. 3 auf den Knospen von *C. spinosa* gefunden. Obwohl die Zucht der Raupen in unserem Laboratorium nicht möglich war, können wir bestätigen, daß die frischgeschlüpften Raupen sich innerhalb der Knospen ernähren.

Summary

In southern Spain, during the summer, *Lampides boeticus* L. uses *Capparis spinosa* as oviposition substrate in areas where no other foodplants are available. Despite the cannibalism frequent in the larva of this species, high egg-loads were observed, especially on plants in full bloom. Eggs were found on average in clusters of around 3 per bud. Although it has not been possible to observe full development of larvae on this plant in the laboratory, we have confirmed that freshly hatched larvae make a hole in the sepals, and feed subsequently inside the bud.

Lampides boeticus (LINNAEUS, 1767) is a widespread species in tropical and temperate zones all over the world, excluding North America. In southern Spain, it is multivoltine, with 4 or 5 generations per year, from April to October. This species lives in very different habitats, including towns (MARTIN, 1984), where it can even feed on fruits of *Robinia pseudoacacia.* Therefore, it presents great ecological plasticity, no doubt enhanced by its migratory habits (NEL, 1984 ; ROBERT *et al.*, 1983), which give it a great capacity for colonising new habitats. However, the key factor in its adaptation to new habitats is undoubtedly its polyphagous feeding habits, its capacity to feed on a wide range of foodplants.

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Around 100 species of Leguminosae are reported for *L. boeticus*, belonging to 40 different genera (JORDANO *et al.*, in press). Few references are available concerning plants of other families. These are *Rosmarinus* sp. (Labiatae) in Spain, *Cliffortia* sp. (Rosaceae) in South Africa, and *Passiflora foetida* (Passifloraceae) in Sumatra (RIBBE, 1909 ; DICKSON, 1953 and DEN DOOP, 1918 in MARTIN, 1984). It should however be mentioned that the range of foodplants used by individual populations is frequently small. In the case of multivoltine species like this, there is often a temporal alternation. For example, in south-eastern France, *L. boeticus* lays its eggs on *Ulex* sp. between January and April, on *Colutea* sp. in May, and during the summer on *Spartium junceum* (NEL, 1984). In Spain, observed preferences for *L. boeticus* are : *Pisum sativum, Colutea atlantica* and *Spartium junceum* (MANLEY & ALLCARD, 1970 ; GOMEZ BUSTILLO & FERNANDEZ RUBIO, 1974 ; MARTIN, 1984).

Larvae of this species need to ingest food which is particularly rich in protein, thus giving rise to the use of plants and parts of plants with a high nitrogen content, such as the reproductive structures (flowers and fruits). This explains the anthophagous and carpophagous habit of the larvae. This pattern is widely found in the Lycaenidae, and has been related to myrmecophily (PIERCE, 1985), a mutualistic relationship which requires a considerable energu investment for the synthesis of amino-acids and sugars, which constitute the reward offered to the ants.

In southern Spain, the availability of flowers and fruits on which the larvae depend is limited by the marked seasonality of the climate, which influences the phenology of foodplants. This problem is solved in some areas by *L. boeticus* exploiting alfalfa crops (*Medicago sativa*) on irrigated land (MARTIN, 1984 ; pers. obs.), an alternative which ensures the maintenance of a population of relatively high density (JORDANO, 1980). However, this alternative is virtually non-existent in southern Spain, where irrigated land accounts for only a small proportion of cultivated areas, and where alfalfa is a minor crop.

During our research on the biology and ecology of *Colotis evagore* KLUG (Pieridae) in the Guadalquivir river valley, we have frequently observed, over the last three summers, a northward movement of *L. boeticus* across this area. At this time of year, herbaceous plants on the embankments and uncultivated marginal areas dry up. *Capparis spinosa*, the foodplant of *C. evagore*, (also used in summer by two other Pieridae (*Artogeia rapae* L. and *Pieris brassicae* L.), is an exception, since it puts out new shoots annually from large roots, which actually enables it to grow and bloom in summer (FERNANDEZ HAEGER *et. al.*, 1987).

In summer 1984, we frequently observed *L. boeticus* on the leaves of this plant, a fact which we considered unimportant, due to the taxonomic position of *C. spinosa*, at some distance from the Leguminosae and closer to the Cruciferae, with which it shares the presence of glucosinolates, and in particular glucocaparin, identified as methyl-isothiocyanate (KJAER, 1960). These allelochemicals are deterrent to most herbivores.

In summer 1985, a more detailed observation of *L. boeticus* revealed that their presence on such plants was not accidental, and that the plant attracted the butterflies, as shown by the constancy and frequency of their visits. We were able to confirm that on most occasions, they were females, whose behaviour were characteristic of the foodplant identification phase. Females moved across the leaves curling the abdomen and crawling the ovipositor over the leaf surface. When they stopped, they rubbed the upper surface of the leaf with the foretarsi, touching it with the tips of the antennae.

We were finally able to confirm the laying of several eggs, scattered over the upper surface of some leaves. This occurred in July in an area near Castro del Rio (province of Córdoba), and was initially interpreted as an oviposition mistake (DETHIER, 1959 ; STRAATMAN, 1962 ; RODMAN & CHEW, 1980), which was somewhat unexpected in view of the nature of the plant, and the fact that wild *Medicago sativa* plants, with ripening fruits and still some inflorescences, were growing in a ditch only a few meters away. These plants, where several *Polyommatus icarus* females were found to be laying, were apparently ignored by *L. boeticus.*

In the summer of 1986 we were able to confirm conclusively that the oviposition observed in the previous year was not an isolated case. This was borne out by the observation of many females laying on unopened *C. spinosa* flowers in September near Moriles (Province of Córdoba). A close study of the plants revealed several *L. boeticus* eggs, some of which had hatched. An average of 3.35 ± 1.99 eggs ($n = 23$) were found per bud, and 82.6% of the buds contained clusters of two or more eggs (Fig. 1), despite the cannibalism common in the caterpillars of this species (MARTIN, 1984 ; pers. obs.). The preference for unopened flowers as an oviposition substrate agrees with the results obtained by MARTIN (1984), who found 84.4% of eggs laid on flowers and only 10.6% on leaves.

These observations may also explain the laying preference observed in another area in September 1986, where eggs were found on burnt and re-sprouted plants, in full bloom at that time, rather than on plants which had not been burnt, that were phenologically more advanced and had almost finished flowering. The *C. spinosa* in this area covers the verge of a road, forming a straggling hedge about 400 metres long. It is sometimes partially

Fig. 1. Number of eggs of *L. boeticus* on buds of *C. spinosa.*

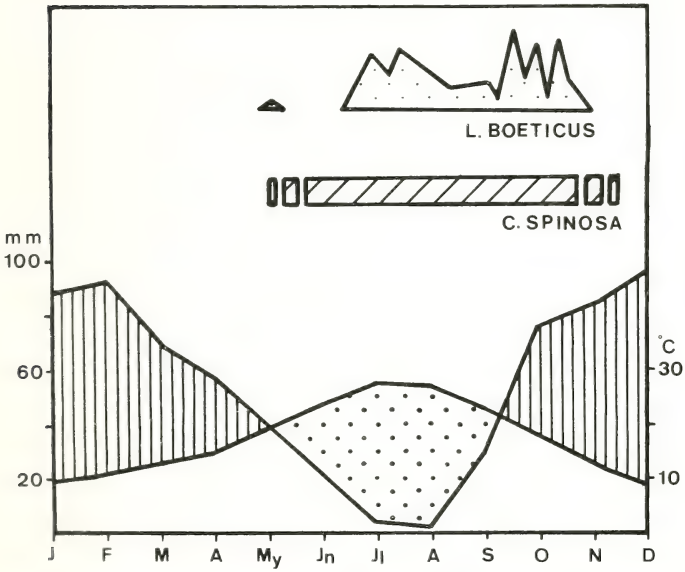

Fig. 2. Ombrothermic diagram of the city of Córdoba : The phenology of *C. spinosa* and abundance of *L. boeticus.* The vegetative growth period of the plant (inset) coincides with hot, dry weather ; this period also coincides with the period when *L. boeticus* numbers are highest (inset, top).

burnt. Burnt plants tend to put out new shoots around 20 days later, and bloom again in profusion.

This may also explain the laying of eggs on leaves, seen in the first area mentioned above in 1985, where buds were scarce, because of mass picking for commercial purposes.

The phenology of the plant is also observed to coincide with the periods of greatest abundance of *L. boeticus* (summer and autumn generations), when numbers are swelled by migrating individuals (Fig. 2).

To chart the development of the larvae, bud samples were collected and observed in the laboratory, where caterpillars hatched normally. After making a hole in the sepals, they entered the bud and fed mainly on the anthers. Limited availability of buds, together with their rapid deterioration after cutting, led to the failure of the rearing experiment. Despite this, several caterpillars continued to develop up to the third instar. In this connection, it should be pointed out that *Pontia daplidice* L. females were occasionally seen to lay on the leaves of this plant. Nevertheless, and despite its biochemical relationships with the Cruciferae and Resedaceae, usually used for oviposition by *P. daplidice*, the newly hatched caterpillars of this species rejected it completely, finally dying of starvation.

Thus, though it has not been possible to study the full larval development on this plant, it seems likely that, under natural conditions, this species may be able to complete its life cycle on it.

References

DETHIER, V. G., 1959. Egg-laying habits in lepidoptera in relation to available food. *Can. Ent.* 91 : 554-561.

FERNANDEZ HAEGER, J., D. JORDANO BARBUDO & J. RODRIGUEZ GONZALEZ, 1987. *Capparis spinosa* : a resource for insects during summer food shortage in southern Spain. *Proc. 3rd European Congress of Entomology*, pp. 259-262. Amsterdam.

GOMEZ BUSTILLO, M. R. & F. FERNANDEZ RUBIO, 1974. *Mariposas de la Península Ibérica.* II. Publicaciones del Ministerio de Agricultura. Madrid.

JORDANO, D., 1980. *Estudio ecológico del ciclo anual de una comunidad mediterránea de mariposas diurnas.* Tesina de Licenciatura. Facultad de Ciencias. Universidad de Córdoba.

JORDANO, D. & J. RODRIGUEZ (in press). Nuevas citas de plantas nutricias para tres especies de ropalóceros. *SHILAP, Revta. Lepid.*

KJAER, A., 1960. Naturally derived isothiocyanates (mustard oils) and their parent glucosides. *Fortsch. Chem. Org. Naturst.* 18 : 122-176.

MANLEY, W. B. L. & H. G. ALLCARD, 1970. *A field guide to the butterflies and burnets of Spain.* E. W. CLASSEY Ltd. Publishers. London.

MARTIN, J., 1984. Biologia comparada de *Lampides boeticus* (L.), *Syntarucus pirithous* (L.) y *Polyommatus icarus* (ROT.) (Lep., Lycaenidae). *Graellsia* XL : 163-193.

NEL, J., 1984. *Sur la plasticité écologique et la biologie de quelques lépidoptères (Rhopalocera) du sud-est méditerranéen de la France.* These. Faculté des Sciences et Techniques de Saint-Jerome. Université d'Aix-Marseille.

PIERCE, N. E., 1984. Lycaenid butterflies and ants : Selection for nitrogen-fixing and other protein-rich food plants. *Am. Nat.* 125 : 888-895.

ROBERT, J. H., A. ESCARRE, T. GARCIA & P. MARTINEZ, 1983. *Lepidópteros ropalóceros.* Cuadernos de la Fauna Alicantina. IV. Publicaciones del Instituto de Estudios Alicantinos. Serie II, n° 20. Alicante.

RODMAN, J. E. & F. S. CHEW, 1980. Phytochemical correlates of herbivory in a community of native and naturalized Cruciferae. *Biochemical Systematics and Ecology* 8 : 43-50.

STRAATMAN, R., 1962. Notes on certain Lepidoptera ovipositing on plants which are toxic to their larvae. *J. Lepid. Soc.* 26 : 99-103.

Corrigendum

The editor would like to apologize for an unfortunate error in the list of contents of *Nota lepid.* 10 (3) : 137. For *Noctua warrensis* sp.n., read *Noctua warreni* sp.n.

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The systematic status of the genera *Ilseopsis* POVOLNÝ, 1965, and *Empista* POVOLNÝ, 1968 (Lepidoptera : Gelechiidae : Gnorimoschemini)

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Abstract

The systematic status of the genera *Ilseopsis* POVOLNÝ and *Empista* POVOLNÝ, including its subgenus *Zeempista* POVOLNÝ, is discussed. *Ilseopsis* and *Zeempista* are recognized as junior subjective synonyms of *Scrobipalpa* JANSE and *Kiwaia* PHILPOTT respectively ; *Empista* is reduced to a subgenus of *Kiwaia*. One species is recalled from synonymy and 30 new combinations are introduced. The head structures of two *Scrobipalpa* species are illustrated by SEM photomicrographs.

Zusammenfassung

Der systematische Status der Gattungen *Ilseopsis* POVOLNÝ und *Empista* POVOLNÝ, einschließlich der Untergattung *Zeempista* POVOLNÝ, wird diskutiert. *Ilseopsis* und *Zeempista* werden als jüngere subjektive Synonyme zu *Scrobipalpa* JANSE bzw. *Kiwaia* PHILPOTT gezogen ; *Empista* wird zur Untergattung von *Kiwaia* heruntergestuft. Eine Art wird aus der Synonymie gerufen, und 30 neue Kombinationen werden eingeführt. Die Kopfstrukturen von zwei *Scrobipalpa*-Arten werden in REM-Fotos dargestellt.

The Gnorimoschemini are a tribe of the Gelechiidae : Gelechiinae with almost worldwide distribution. Most of the currently recognized 35 or so gnorimoschemine genera are based exclusively on morphological characters of the male and female genitalia and can be separated satisfactorily from each other by these structures. An exception is the monotypic genus *Ilseopsis* POVOLNÝ, 1965, containing *I. peterseni* POVOLNÝ from North Africa and Saudi Arabia. It will be shown in this paper that *Ilseopsis* cannot be separated from *Scrobipalpa* JANSE, 1951. It will also be shown that the genus *Empista* POVOLNÝ, 1968, originally described from Nepal, is merely a subgenus of the New Zealand genus *Kiwaia* PHILPOTT, 1930, and that *Zeempista* POVOLNÝ, 1974, originally proposed as a subgenus of *Empista*, is a junior subjective synonym of *Kiwaia*. The results of my studies are published here to be

available for the Gnorimoschemini volume of Microlepidoptera Palaearctica that is currently in preparation by POVOLNÝ with the assistance of ROESLER.

In the original description of *Ilseopsis*, POVOLNÝ emphasized as good generic characters in the male genitalia the strong bend at the basal third of the valva, the reduction of the first pair of saccular processes and the relatively short small saccus, and in the female genitalia the short apophyses anteriores. Before discussing the validity of these presumed generic characters, some aspects of the terminology adopted by POVOLNÝ must be clarified. In the male genitalia of *Scrobipalpa* (Figs 4, 5) and *Ilseopsis* (Figs 2, 3) the posterior margin of the vinculum is characterized by a V-shaped median emargination flanked by a pair of short but usually distinct processes. These are referred to by POVOLNÝ as the first pair of saccular processes ("erstes Paar der Saccularfortsätze") whilst the vinculum is interpreted as saccular fold ("Saccularfalte"). The proper sacculus is vaguely described as a shovel-shaped process fused with the base of the valva ("mit der Valvenbasis verwachsener schaufelförmiger Fortsatz") and in POVOLNÝ's later publications is termed "parabasal process of the valva".

The weakly clavate valva of most *Scrobipalpa* species is more or less straight ; however, in *S. ocellatella* (BOYD, 1858) (Fig. 4), an otherwise undisputed *Scrobipalpa*, it is bent nearly as strongly as in *peterseni* (Fig. 2). The posterior processes of the vinculum ("saccular processes") are very small in *peterseni*, but varying degrees of reduction are found in several *Scrobipalpa* species. Reference to the "first pair of saccular processes" implies that there should be at least a second pair ; however, no further pair exists in *Scrobipalpa* or *Ilseopsis* unless POVOLNÝ means the sacculi. The saccus of *peterseni* agrees perfectly with that of many *Scrobipalpa* species ; it is neither unusually short nor small. The female genitalia of *peterseni* with strong honeycomb pattern on segment VIII and a hook-like signum are consistent with those of *Scrobipalpa*. The apophyses anteriores are indeed very short, but their length can vary considerably between *Scrobipalpa* species and sometimes even within a species. None of these characters justifies the generic separation of *peterseni* from *Scrobipalpa*.

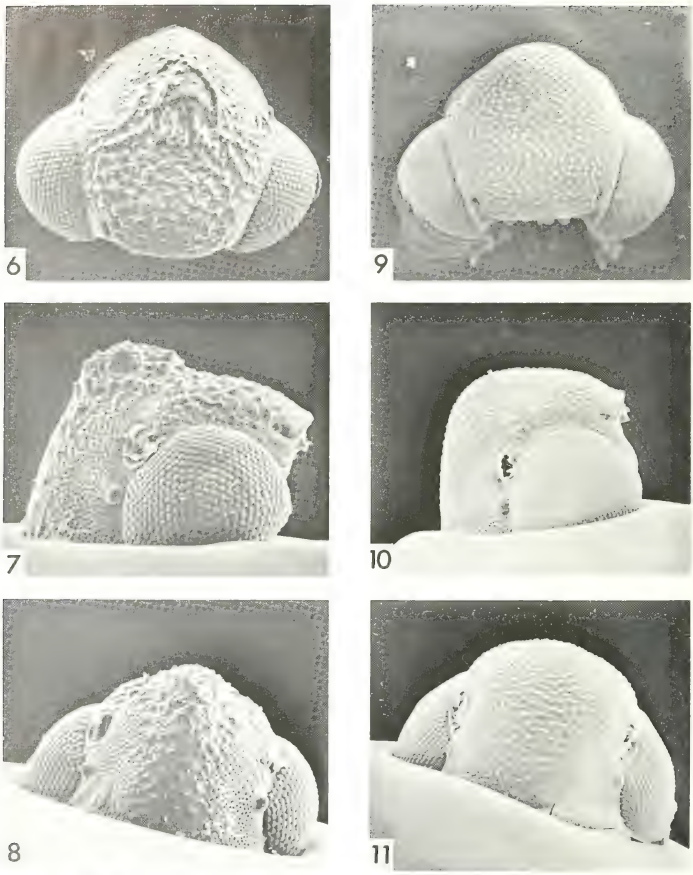
An unusual character overlooked by POVOLNÝ is the irregular frontal process on the head of *peterseni* (Figs 6-8), reminiscent of the processes of certain *Ornativalva* species, for example *O. lilyella* (LUCAS, 1944) (SATTLER, 1976, pl. 6, figs 39-41). Modifications of the frontal region have evolved independently in several families of Lepidoptera, for example Cosmopterigidae, Symmocidae, Pyralidae, Geometridae, Thyrididae, Noctuidae and Notodontidae. In the Gelechiidae various frontal modifications, including clearly defined processes, are known in *Ornativalva* GOZMÁNY, 1955, *Athrips* BILLBERG, 1820, *Lita* TREITSCHKE, 1833, *Cerofrontia* JANSE, 1951, *Radio-*

nerva JANSE, 1951, *Leistogenes* MEYRICK, 1927, *Caulastrocecis* CHRÉTIEN, 1931, and others. None of the *Scrobipalpa* species examined for this character possesses a frontal process, but an evenly expanded frons with enlarged scale bases, the first step towards the development of a distinct process, was observed in *S. usingeri* POVOLNÝ, 1969, from Mongolia (Figs 9-11). Species with and without frontal processes are found side by side in several genera (for example *Ornativalva, Athrips* and *Lita*). The presence of this structure in *peterseni* is thus no justification for its exclusion from *Scrobipalpa.*

Fig. 1. *Scrobipalpa peterseni* (POVOLNÝ), ♂, Algeria, Biskra, 24.iii.1903 (WALSINGHAM) (BMNH).

The wings of *peterseni* (Figs 1, 12) are rather narrower than those of most *Scrobipalpa* species. The forewing in particular is broadly lanceolate and more pointed than that of most other species. The costa, which is usually gently arched and more or less evenly convex from base to apex in *Scrobipalpa*, is straight or even weakly concave between R1 and the apex in *peterseni*. Such modification of the forewing shape, sometimes with loss of an M vein, is observed in certain brachypterous species, and I consider it possible that both sexes of *peterseni* are flightless. It may therefore be significant that one of the examined specimens of *peterseni* lacks one of the M veins in the forewing, probably M2 or M3 (Fig. 12).

Figs 2-5. Male genitalia. 2, *Scrobipalpa peterseni* (POVOLNÝ), Algeria, Biskra, 24.iii.1903 (WALSINGHAM) (genitalia slide no. 15846 ; BMNH). 3, ditto, aedeagus. 4, *S. ocellatella* (BOYD), England, Winspit, 10.vii.1886 (BANKES) (genitalia slide no. 23615 ; BMNH). 5, ditto, aedeagus.



Figs 6-11. SEM photomicrographs of *Scrobipalpa* heads ; frontal, lateral and dorsal views. 6-8. *S. peterseni* (POVOLNY), ♂, Algeria, Hammam-es-Salahin, 6.iii.1904 (WALSINGHAM) (BMNH). 9-11. *S. usingeri* POVOLNY, ♂, Mongolia, Südgobi aimak, 100 km W v. Grenzposten Ovot Chuural, 1250 m, 22.vi.1967 (KASZAB, Nr. 834) (BMNH).

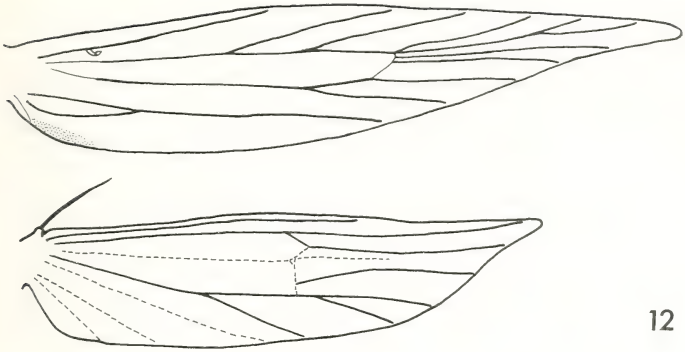


Fig. 12. Wing venation of *Scrobipalpa peterseni* (POVOLNÝ), ♂, Algeria, Hammam-es-Salahin, 5.iii.1904 (WALSINGHAM) (wing slide no. 15861 ; BMNH). Forewing with reduced number of M veins.

A more extreme example of flightlessness in the Gnorimoschemini is a brachypterous *Ephysteris* species from the island of Madeira (see below). In this species the apex of the forewing is even longer than in *peterseni*, veins R4 + 5 are coincident and one M vein is missing ; the hindwing is strongly reduced and has lost most of its venation. An analogous case of loss of an M vein in the forewing is also known in *Thyrocopa apatela* (WALSINGHAM, 1907) (Gelechioidea : Xyloryctidae) from the Hawaiian Islands, a flightless species with wing reduction in males and females (ZIMMERMAN, 1978 : 937, figs 645, 650).

Ephysteris sp. and *Thyrocopa apatela* are both undisputed members of genera with many closely related fully winged species. The slightly unusual forewing shape of *peterseni*, with occasional loss of an M vein, here interpreted as a tendency towards wing reduction, is in itself no justification for the separation of *Ilseopsis* from *Scrobipalpa*. Moreover, as all Gnorimoschemini genera are, without exception, defined by characters of the genitalia it would be inconsistent to break this principle for *peterseni*.

Having demonstrated that *peterseni* does not deserve a separate genus, its position within *Scrobipalpa* has to be established. *Scrobipalpa* is by far the largest genus of Gnorimoschemini ; the number of included species has doubled in the last 20 years to almost 300. The majority of species are found in arid areas of the western Palaearctic region ; no less than 60-70 species

are recorded from Europe. Their monophagous or oligophagous larvae are predominantly associated with Compositae, Chenopodiaceae and Solanaceae. On account of their great external uniformity the identification of many species was always problematic. Even many of those published in recent years are inadequately known because they were described from only one sex, sometimes a single imperfectly preserved and poorly documented specimen. Moreover, they were rarely compared with related species and no keys were provided. The large number of misidentifications found amongst material that had been examined in recent times by specialists with the aid of genitalia preparations is a clear indication that there is at present no one who can reliably identify all *Scrobipalpa* species. For example, specimens with genitalia preparations originally identified by POVOLNÝ as *S. acuminatella* (SIRCOM, 1850) and *S. artemisiella* (TREITSCHKE, 1833), and later as *S. murinella* (HERRICH-SCHÄFFER, 1854), were in fact *S. halonella* (HERRICH-SCHÄFFER, 1854) (SATTLER, 1987 : 452).

No attempt has ever been made to provide a systematic arrangement of *Scrobipalpa* into which newly discovered species could be integrated. In fact, it is hard to understand how, in the absence of a classification, "new" species could ever be recognized as such with any degree of certainty in a genus of this size. The unsatisfactory situation in *Scrobipalpa* contrasts sharply with that in other large genera. For example, the similarly uniform but even larger genus *Coleophora* HÜBNER, 1822 (Coleophoridae) was divided by TOLL (1953, 1962) into groups, sections and subsections, all made generally accessible through keys.

Frustrated by this chaos, POVOLNÝ in his numerous papers has resorted to treating the species in a roughly alphabetical sequence (in this "system" *peterseni* would be placed between *S. perinoides* POVOLNÝ, 1967, and *S. phagnalella* (CONSTANT, 1895) !) or at best grouping them vaguely by their host-plants (unknown for *peterseni*). Amongst the morphological characters that might help indicate relationship with other species is the forewing shape of *peterseni* with occasional loss of an M vein ; however, this specialization is not known in any other *Scrobipalpa*. A modified frons, although not a well-defined process as in *peterseni*, is found in *S. usingeri* POVOLNÝ, but experience in other gelechiid genera has shown that frontal processes can arise independently more than once and that closely related species can differ in the presence or absence of frontal modifications. Other morphological characters do not appear to confirm a closer relationship between *peterseni* and *usingeri*. A bent valva similar to that of *peterseni* is also found in *S. ocellatella* (BOYD), but other genitalic characters neither confirm nor contradict a closer relationship between these two species.

Scrobipalpa peterseni (POVOLNÝ, 1965) **comb. n.**

Ilseopsis peterseni POVOLNÝ, 1965, Acta ent. bohemoslovaca *62*: 481, figs 1, 2. Holotype ♂, SAUDI ARABIA: Riyad, 700 m, 1.viii.-30.ix.1958 (DIEHL) (Landessammlungen für Naturkunde, Karlsruhe) [not examined].

Ilseopsis peterseni POVOLNÝ; POVOLNÝ, 1971: 43; 1979: 113; 1980a: 243; 1980b: 204; 1981: 394.

Head ♂, ♀ (Figs 6-8). Scale bases dense along margin of compound eyes and around ocelli and antennal sockets, almost absent from vertex between posterior margin of head and frontal process. Transfrontal sulcus indistinct. Frontal process short, rough, with irregular surface. Scale bases between frontal process and tentorial pits enlarged to irregular knobs or teeth.

Venation ♂, ♀ (Fig. 12). In forewing Sc to costa at about two-fifths, R1 and R2 free from cell, R3 free or connate with R4 + 5, common stalk longer than free ends of R4 and R5; M1 near R4 + 5, M2 and M3 approximated at base, almost connate; Cu1 and Cu2 parallel to M3, distance at base of M3-Cu1 about half Cu1-Cu2, A1 + 2 with basal fork, discocellular vein obsolete around base of M1 and M2. In hindwing Sc + R1 to costa at about two-thirds, basal section of R1 weak or absent between Rs and Sc, Rs to costa close to apex, M1 from cell, parallel to Rs, M2 gently curved, at base closer to M3 + Cu1, on termen closer to M1, M3 on short stalk with Cu1 from corner of cell, Cu2 arising behind middle of cell, parallel to Cu1, A1 weak, A2 obsolete, discocellular vein obsolete.

Host-plant unknown. POVOLNÝ (1980b: 204) suspected the larva to be a miner of Compositae but gave no reason for this view. If the bent valva of the males is a synapomorphy of *peterseni* and *ocellatella*, the host-plant will more likely be found amongst the Chenopodiaceae.

Distribution. Algeria, Tunisia, Saudi Arabia.

Material examined. Algeria: 2 ♂, 2 ♀, Hammam-es-Salahin, 14.iii.1903 (♀), 24.iii.1903 (♂), 5.iii.1904 (♂), 3.iv.1904 (♀) (WALSINGHAM) (BMNH, London).

The hitherto monotypic New Zealand genus *Kiwaia* was established for *K. jeanae*, a species based on two brachypterous males. The generic description emphasizes the striking dense cover of fine radiating hair-scales on the rudimentary hindwing. It was subsequently shown that the female of the type-species is also brachypterous but lacks the long erect hindwing scales.

Brachyptery is a comparatively rare phenomenon in the Lepidoptera. It is usually confined to the female and is exceedingly rare in the male. In the

Gelechioidea species with brachypterous males and females are known in the Xyloryctidae (*Thyrocopa apatela* (WALSINGHAM, 1907) – Hawaii), Oecophoridae (*Borkhausenia falklandensis* BRADLEY, 1965 – Falkland Isiands), Elachistidae (*Elachista holdgatei* (BRADLEY, 1965) – Falkland Islands ; *Elachista galatheae* (VIETTE, 1954) – Campbell Island ; *Elachista hookeri* (DUGDALE, 1971) – Auckland Islands ; *Elachista pumila* (DUGDALE, 1971) – Auckland Islands), Scythrididae (*Areniscythris brachypteris* POWELL, 1976 – California) and Gelechiidae (*Ephysteris* sp. – Madeira ; *Kiwaia jeanae* PHILPOTT, 1930 – New Zealand).

The *Ephysteris* specimens from Madeira were identified by POVOLNÝ (1964 : 346 ; 1965 : 490 ; 1968a : 5, 8) as *E. curtipennis* (ZERNY), a species described from the High Atlas in Morocco ; however, this identification is dubious. ZERNY (1936 : 138) described the male of *curtipennis* as having normal wings and specifically mentioned the parallel costal and dorsal margins of the hindwing. By contrast, the Madeiran males examined by me have broadly lanceolate hindwings, distinctly shorter than the forewings, and are clearly brachypterous like the females. POVOLNÝ initially stated that only the females of "*curtipennis*" (including the Madeiran specimens) were brachypterous (POVOLNÝ, 1964 : 346), whereas subsequently both sexes were said to be brachypterous (POVOLNÝ, 1965 : 490) or no reference to the sexes was made (POVOLNÝ, 1968a : 5, 8).

Thanks to the efforts of John S. DUGDALE (DSIR, Auckland, New Zealand) and Annette WALKER (formerly DSIR, now CIE, London), I was able to study live specimens of *Kiwaia jeanae*. The moths were field collected by John DUGDALE in individual tubes with some plant material and were brought to London by air by Annette WALKER. Both males and females of *jeanae* can run very fast and, like some other flightless moths, are able to make jumps of up to 150 mm. Unfortunately the males did not "display" in captivity and no observations could be made on the function of the striking hindwing scales on the live moth. When the specimen is at rest these scales lie along the upper surface of the hindwing and with it are hidden under the forewing. By manipulating the forewing of a freshly killed specimen with a fine needle it was possible to expose the hindwing. With the gradual exposure of the wing the long scales raised automatically and fanned out ; they returned in a similar way to their original position as the forewing was moved back over the hindwing. For colour illustrations of both sexes, with the male showing the radiating hindwing scales, see HUDSON, 1939, pl. 58, figs 9, 10.

At least some of the brachypterous species recorded here are undisputed members of large genera that otherwise consist of normal fully winged species. It is therefore not surprising to discover that *Kiwaia jeanae* is congeneric with and indeed very closely related to fully winged New Zealand

Gelechiidae. As a result of studies undertaken in conjunction with J. S. DUGDALE it was found that the majority of the New Zealand Gelechiidae hitherto placed in *Gelechia* HÜBNER, [1825], and *Phthorimaea* MEYRICK, 1902, must be transferred to *Kiwaia*. This includes four former *Phthorimaea* which POVOLNÝ (1977) had placed (together with a newly described species) in *Empista*, subgenus *Zeempista*. My studies have shown that *Empista* POVOLNÝ, 1968, can at best be given subgeneric rank whilst *Zeempista* POVOLNÝ, 1974, is a straight synonym of *Kiwaia*.

Subgenus **Kiwaia** PHILPOTT, 1930

Kiwaia PHILPOTT, 1930, Rec. Canterbury Mus. 3 : 248. Type-species : *Kiwaia jeanae* PHILPOTT, 1930, ibid. 3 : 249, by original designation and monotypy.

Zeempista POVOLNÝ, 1974, Acta ent. bohemoslovaca 71 : 414. Type-species : *Gelechia cheradias* MEYRICK, 1909, Trans. N. Z. Inst. 41 : 12, by original designation. Originally proposed as a subgenus of *Empista* POVOLNÝ, 1968, **Syn. n.**

The subgenus *Kiwaia* is confined to New Zealand and comprises the following species : *Kiwaia* (*Kiwaia*) *aerobatis* (MEYRICK, 1924) **comb. n.** ; *brontophora* (MEYRICK, 1885) **comb. n.** ; *caerulea* (HUDSON, 1925) **comb. n.** ; *calaspidea* (CLARKE, 1934) **comb. n.** ; *cheradias* (MEYRICK, 1909) **comb. n.** ; *contraria* (PHILPOTT, 1930) **comb. n.** ; *dividua* (PHILPOTT, 1921) **comb. n.** ; *eurybathra* (MEYRICK, 1931) **comb. n.** ; *glaucoterma* (MEYRICK, 1911) **comb. n.** ; **sp. rev.** ; *heterospora* (MEYRICK, 1924) **comb. n.** ; *hippeis* (MEYRICK, 1901) **comb. n.** ; *jeanae* PHILPOTT, 1930 ; *lapillosa* (MEYRICK, 1924) **comb. n.** ; *lenis* (PHILPOTT, 1929) **comb. n.** ; *lithodes* (MEYRICK, 1885) **comb. n.** ; *matermea* (POVOLNÝ, 1974) **comb. n.** ; *monophragma* (MEYRICK, 1885) **comb. n.** ; *neglecta* (PHILPOTT, 1924) **comb. n.** ; *parapleura* (MEYRICK, 1885) **comb. n.** ; *parvula* (PHILPOTT, 1930) **comb. n.** ; *pharetria* (MEYRICK, 1886) **comb. n.** ; *plemochoa* (MEYRICK, 1916) **comb. n.** ; *pumila* (PHILPOTT, 1928) **comb. n.** ; *quieta* (PHILPOTT, 1927) (= *pulverea* PHILPOTT, 1928) **comb. n.** ; *schematica* (MEYRICK, 1885) **comb. n.** ; *thyraula* (MEYRICK, 1885) **comb. n.**

POVOLNÝ (1974 : 416) synonymized *glaucoterma* with *brontophora* ; this synonymy is not accepted here as both species can be clearly distinguished by external characters. The validity of *matermea* requires confirmation as POVOLNÝ at the time of its description was unaware of most of the 25 congeneric species.

Subgenus **Empista** POVOLNÝ, 1968, **stat. n.**

Empista POVOLNÝ, 1968b, Khumbu Himal 1 : 116. Type-species : *Empista palaearctica* POVOLNÝ, 1968b, ibid. 3 : 117, figs 1-3, by monotypy.

The subgenus *Empista* is at present known only from Nepal and comprises the following species : *Kiwaia* (*Empista*) *kumatai* (POVOLNÝ, 1976) **comb. n.** ; *palaearctica palaearctica* (POVOLNÝ, 1968) **comb. n.** ; *palaearctica secunda* (POVOLNÝ, 1976) **comb. n.** ; *spinosa* (POVOLNÝ, 1976) **comb. n.**

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References

HUDSON, G. V., 1939. A supplement to the butterflies and moths of New Zealand : 358-481, colour plates 53-62. Wellington, New Zealand.

POVOLNÝ, D., 1964. Gnorimoschemini Trib. Nov. – Eine neue Tribus der Familie Gelechiidae nebst Bemerkungen zu ihrer Taxonomie (Lepidoptera). *Cas. čsl. Spol. ent.* 61 : 330-359, text-figs 1-70, colour pls 1-3.

POVOLNÝ, D., 1965. Neue und wenig bekannte palaearktische Arten und Gattungen der Tribus Gnorimoschemini nebst Bemerkungen zu ihrer Taxonomie (Lepidoptera, Gelechiidae). *Acta ent. bohemoslovaca* 62 : 480-495, figs 1-20.

POVOLNÝ, D., 1968a. Neue und wenig bekannte Taxone aus der Tribus Gnorimoschemini POVOLNÝ, 1964 (Lepidoptera, Gelechiidae). *Přírodov. Pr. Cesk. Akad. Věd.* (N.S.) 2 (3) : 1-44, pls 1-21.

POVOLNÝ, D., 1968b. Drei neue Arten und eine neue Gattung der Tribus Gnorimoschemini (Lepidoptera, Gelechiidae) aus Nepal. *Khumbu Himal* 3 : 116-123, figs 1-3 + 1-9.

POVOLNÝ, D., 1971. Zur Fauna der Tribus Gnorimoschemini (Lepidoptera, Gelechiidae) in Nordwestafrika. *Acta ent. bohemoslovaca* 68 : 23-44, figs 1-54.

POVOLNÝ, D., 1974. Revision of the genus *Empista* POVOLNÝ, (*Zeempista* subgen. n.) from New Zealand (Lepidoptera, Gelechiidae). *Acta ent. bohemoslovaca* 71 : 414-428, figs 1-32.

POVOLNÝ, D., 1977. Notes on Gnorimoschemini of Australia and New Zealand (Lepidoptera, Gelechiidae). *Acta ent. Mus. natn. Pragae* 39 : 403-443, figs 1-78, maps 1-4.

POVOLNÝ, D., 1979. Eine Ausbeute der Tribus Gnorimoschemini aus Tunis (Lepidoptera : Gelechiidae). *Folia ent. hung.* (S.N.) 32 (1) : 111-119, figs 1-8.

POVOLNÝ, D., 1980a. Insects of Saudi Arabia. Lepidoptera : Fam. Gelechiidae, Tribus Gnorimoschemini. *Fauna Saudi Arabia* 2 : 241-251, figs 1-10.

POVOLNÝ, D., 1980b. Die bisher bekannten Futterpflanzen der Tribus Gnorimoschemini (Lepidoptera, Gelechiidae) und deren Bedeutung für taxonomisch-ökologische Erwägungen. *Acta Univ. Agric. Brno* (A) 28 (1) : 189-210.

POVOLNÝ, D., 1981. Über neue und wenig bekannte Arten der Tribus Gnorimoschemini (Lep., Gelechiidae) aus dem Mediterraneum. *Acta Univ. Agric. Brno* (A) 29 (1-2) : 365-397, figs 1-61.

SATTLER, K., 1976. A taxonomic revision of the genus *Ornativalva* GOZMÁNY, 1955 (Lepidoptera : Gelechiidae). *Bull. Br. Mus. nat. Hist.* (Ent.) 34 : 85-152, pls 1-27, text-figs 1-27.

SATTLER, K., 1987. Die an Compositen gebundenen *Scrobipalpa*-Arten des östlichen Österreichs (Lepidoptera, Gelechiidae). *Annln naturhist. Mus. Wien* 88/89 (B) : 435-456, figs 1-34.

TOLL, S., 1953. Rodzina Eupistidae polski. *Mater. Fizjogr. Kraju* 32 : 1-292, text-figs 1-31, pls 1-38.

TOLL, S., 1962. Materialien zur Kenntnis der paläarktischen Arten der Familie Coleophoridae (Lepidoptera). *Acta zool. cracov.* 7 : 577-720, text-figs 1-5, pls 1K-14K, 1F-10F, 1A-43A, 1M-19M, 1W-14W, 1S-33S.

ZERNY, H., 1936. Die Lepidopterenfauna des Grossen Atlas in Marokko und seiner Randgebiete. *Mém. Soc. Sci. nat. Maroc.* 42 : 1-163, pls 1, 2.

ZIMMERMAN, E. C., 1978. *Insects of Hawaii.* Vol. 9, Microlepidoptera, 1903 pp., 1355 text-figs, 8 colour pls. The University Press of Hawaii, Honolulu.

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The problem of infrasubspecific names in some groups of Lepidoptera

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Abstract

Problems of availability, authorship and dates of names used for geographical forms in some groups of Lepidoptera, such as European butterflies and the genus *Zygaena* FABRICIUS, 1775, are discussed. For *Zygaena*, a practical solution is proposed which, if adopted, would lead to a stable nomenclature.

Zusammenfassung

Die Problematik der Verfügbarkeit, Autorschaft und Datierung von gebräuchlichen Namen für geographische Formen gewisser Lepidopterengruppen, z.B. europäischer Tagfalter und der Gattung *Zygaena* FABRICIUS, 1775, wird diskutiert. Für *Zygaena* wird eine praktische Lösung vorgeschlagen, deren Annahme zu einer stabilen Nomenklatur führen würde.

When early specialists such as Otto HOLIK, Manfred KOCH and Hugo REISS described and named geographical forms of *Zygaena* FABRICIUS, 1775, it was customary to denote such taxa as subspecies and varieties, the latter category being a subdivision of the former (individual forms were denoted as aberrations). This system was originally introduced by BURGEFF (1926a : 5 ; 1926b) and had it been followed consistently, the nomenclature of the group would now be relatively free of problems regarding availability, authorship and dates. However, up to the 1960s it was not uncommon for authors (specialists and non-specialists alike) to relegate subspecies to varietal level or, more frequently, to elevate varieties to subspecific rank. From the 1960s most newly described geographical forms were categorized as subspecies, because *Zygaena* specialists were more aware of the provisions of the *Int. Code zool. Nom.* and had begun to apply them to the group. Even before the publication of the 1961 edition of the *Code*, DUJARDIN (1956 : 252) stated "En application des Règles de la Nomenclature trinominale en vigueur, nous sommes actuellement dans l'obligation de réserver le terme de 'sous-espèce' à toute race ou forme géographique prédominante bien différenciée...".

Under the provisions of the *Code*, an infrasubspecific name such as a quadrinomen is unavailable. However, the question of availability, authorship and date does arise when a varietal name, originally established as quadrinominal, is raised to subspecific rank. The 1985 edition of the *Code* is more explicit than the two previous editions : Article 45 (f) (iii) states that a name is "infrasubspecific, if the author, when publishing the name, published it as an addition to a trinomen...". However, during the last three decades confusion has arisen over the availability, authorship and date of many of the names established for geographical forms, because of ambiguities in the 1961 and 1964 editions of the *Code*. In these editions, Article 17 (9) states that a name is or remains available even though "before 1961, it was proposed as a 'variety' or 'form'" ; Article 45 (e) (i) states "Before 1961, the use of either of the terms 'variety' or 'form' is not to be interpreted as an express statement of either subspecific or infrasubspecific rank" ; Article 45 (e) (ii) states "After 1960, a new name published as that of a 'variety' or 'form' is to be regarded as of infrasubspecific rank". When preparing the catalogue of *Zygaena*, REISS & TREMEWAN (1967) were guided by these articles ; fully aware of the inconsistent treatment of geographical forms by previous workers, and following current usage, they placed the majority of varieties at subspecies level and attributed the names to their original authors and dates.

Recently, KUDRNA (1983), KUDRNA & BALLETTO (1984), BALLETTO & KUDRNA (1986) and KOÇAK (1984) have drawn attention to the availability/unavailability of certain names established for geographical forms of European butterflies and *Zygaena*.

The paper by KUDRNA (1983) concerns the nominal taxa of Papilionoidea described by VERITY ; in the introduction (pp. 1-7), VERITY's concept of species, subspecies/exerge and race, and the nomenclatural problems arising from such a system, are fully described. As pointed out by KUDRNA, the most confusing category in VERITY's publications is the term "race", which has been misinterpreted by subsequent workers many of whom have treated the VERITY names originally proposed in this category as subspecific and thus available. Because of the widespread placement of VERITY's races at subspecific level, KUDRNA contends that such names should be treated as available if they were originally proposed in a trinominal combination. The views expressed by KUDRNA (1983) relative to the Papilionoidea are also reflected in the paper by BALLETTO & KUDRNA (1986), which deals exclusively with the nominal taxa of Zygaenidae described by VERITY.

According to Article 45 (f) (ii) of the present *Code*, the names categorized by VERITY as "race" in a trinominal combination are indeed available. However, the question of availability does arise when a name, originally established by VERITY for a race, was published as a quadrinomen. For

example, having considered the two species *Zygaena rhadamanthus* (ESPER, 1794) and *Zygaena oxytropis* BOISDUVAL, [1828] to be no more than subspecies, VERITY (1920 : 161) established the taxon *pyrenaea* as a race of *Zygaena rhadamanthus rhadamanthus*. When *Z. rhadamanthus* and *Z. oxytropis* were re-established as distinct species by subsequent authors, *pyrenaea* was placed as a subspecies of the former (e.g. LE CHARLES, 1934 : 679).

If Articles 10 (c), 23 (j) and 50 (c) (i) of the present *Code* are followed, the name *pyrenaea* should be attributed to the first author who subsequently used it for a subspecies, with priority from that date. Unfortunately, the strict application of these rules to the genus *Zygaena* is impractical. In spite of meticulous attention to detail prior to the publication of their paper, BALLETTO & KUDRNA (1986) erroneously attributed the nominal taxa *duponcheli* VERITY, 1921, *pulcherrima* VERITY, 1921, *pyrenaea* VERITY, 1920, and *pyrenes* VERITY, 1921, to REISS & TREMEWAN (1967), to cite only four examples from their list. These taxa were in fact first raised (as far as I can ascertain) to subspecies level by LE CHARLES (1934) more than 30 years before ; they are mentioned here merely as examples and not as a criticism of BALLETTO & KUDRNA's excellent work. In fact, BALLETTO & KUDRNA (1986 : 228) emphasise the futility of undertaking a thorough search of the literature published during the past 70 years, in order to ascertain who may have possibly validated a number of the 2000 names established by VERITY. Moreover, they point out the ambiguity of Article 10 (b) of the 1964 edition of the *Code* and state that, if broadly interpreted, any quotation of an infrasubspecific name at species or subspecies level can constitute availability of that name (this also applies to Article 10 (c) of the third edition of the *Code* (1985)). I fully agree with their opinion that such efforts contribute nothing to the advancement of science, especially as, in the case of *Zygaena*, the majority of such names will eventually be placed as synonyms.

KOÇAK (1984 : 156-158), in one of his papers criticising the work of LERAUT (1980), discusses the availability, authorship and dates of nine nominal taxa established for geographical forms of *Zygaena* species, attributing them to TREMEWAN (1961), TREMEWAN & REISS (1964) or REISS & TREMEWAN (1967). However, two of these taxa, *altalavandulae* REISS, 1953, and *tourrettica* REISS, 1953, were in fact cited as subspecies by REISS in 1958, while by inference *pyrenaica* BURGEFF, 1926, was raised to subspecies level by BERNARDI & VIETTE (1959 : 6). It should be mentioned that KOÇAK's emendation of *tourrettica* REISS to '*tourretica*' is unjustified as the original spelling is correct and based on the type-locality Tourrettes-sur-Loup.

The catalogue of *Zygaena* by REISS & TREMEWAN (1967) is currently being revised. The new edition will include all nominal taxa belonging to the subfamily Zygaeninae but will exclude the names of individual forms or

aberrations. It will also reflect recent research on geographical variation and a much broader concept of the subspecies category, resulting in a large number of new synonyms.

In attempting to produce a stable nomenclature, the difficulties arising from trinomina/quadrinomina are immediately apparent. If Articles 10 (c), 23 (j) and 50 (c) (i) of the present *Code* are applied to geographical forms of *Zygaena*, the enormous amount of time and effort required to search the literature cannot be justified, nor would it contribute to the advancement of science, as pointed out by BALLETTO & KUDRNA (1986) ; moreover, a taxonomist can never be absolutely certain that an earlier citation has not been overlooked. With regard to *Zygaena*, one solution would be to attribute to its original author and date every nominal taxon now used at subspecific level, even if first established as quadrinominal before 1961 ; an application should then be made to the International Commission on Zoological Nomenclature requesting them to rule that the names first established as quadrinomina should nevertheless be attributed to their original authors and dates.

The purpose of the present paper is to highlight the problem, to review what has been done to date, and to solicit opinions and possible solutions from lepidopterists other than *Zygaena* specialists.

References

BALLETTO, E. & KUDRNA, O., 1986. An annotated catalogue of the Burnets and Foresters (Lepidoptera : Zygaenidae) named by Roger VERITY. *J. Res. Lepid.* 24 (1985) : 226-249.

BERNARDI, G. & VIETTE, P., 1959. Deux nouvelles sous-espèces françaises du genre *Zygaena* FABRICIUS (Lep. Zygaenidae). *Entomologiste* 15 : 3-6.

BURGEFF, H., 1926a. Kommentar zum palaearktischen Teil der Gattung *Zygaena* FAB. des früher von Ch. AURIVILLIUS und H. WAGNER, jetzt von E. STRAND herausgegebenen Lepidopterorum Catalogus. *Mitt. münch. ent. Ges.* 16 : 1-86.

BURGEFF, H., 1926b. Fam. Zygaenidae I (Generis *Zygaena* palaearctica pars). In STRAND, E., *Lepid. Cat.* 4 (33) : 1-91.

DUJARDIN, F., 1956. Description de races et formes nouvelles de Zygènes, principalement du sud-est de la France (Lep. Zygaenidae). *Bull. mens. Soc. linn. Lyon* 25 : 252-263.

KOÇAK, A. Ö., 1984. More additions and corrections to the names published in "Systematic and synonymic list of the Lepidoptera of France, Belgium and Corsica" by LERAUT, 1980. *Priamus* 3 : 155-168.

KUDRNA, O., 1983. An annotated catalogue of the butterflies (Lepidoptera : Papilionoidea) named by Roger VERITY. *J. Res. Lepid.* 21 (1982) : 1-105, pl., text-fig.

KUDRNA, O. & BALLETTO, E., 1984. An annotated catalogue of the Skippers (Lepidoptera : Hesperiidae) named by Roger VERITY. *J. Res. Lepid.* 23 : 35-49.

LE CHARLES, L., 1934. *Zygaena* FABRICIUS, 1775, pp. 667-700. In LHOMME, L., 1923-1935, *Catalogue des Lépidoptères de France et de Belgique* 1 : 800 pp. Le Carriol.

LERAUT, P., 1980. *Liste systématique et synonymique des Lépidoptères de France, Belgique et Corse* 334 pp. Paris.

REISS, H., 1958. Deuxième contribution à la faune des Lépidoptères, en particulier des Zygaenae des Alpes-Maritimes. *Bull. Soc. ent. Mulhouse* 1958 : 45-63.

REISS, H. & TREMEWAN, W. G., 1967. A systematic catalogue of the genus *Zygaena* FABRICIUS (Lepidoptera : Zygaenidae). *Series ent.* 2 : xvi, 329 pp.

TREMEWAN, W. G., 1961. A catalogue of the types and other specimens in the British Museum (Natural History) of the genus *Zygaena* FABRICIUS, Lepidoptera : Zygaenidae. *Bull. Br. Mus. nat. Hist.* (Ent.) 10 : 239-313, pls 50-64.

TREMEWAN, W. G. & REISS, H., 1964. The *Silvicola* BURGEFF group of the genus *Zygaena* FABRICIUS (Lep., Zygaenidae). *Entomologist's Rec. J. Var.* 76 : 1-10, fig. 1 (distr. map), 46-54, 74-82.

VERITY, R., 1920. On *Zygaena rhadamanthus* ESPER, with special reference to the races of its subspecies *oxytropis* BOISD. *Entomologist's Rec. J. Var.* 32 : 158-162.

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Notes on the status of *Armenia hyrcanica* (RILEY, 1939) (Lepidoptera : Lycaenidae)

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Summary

The taxonomical status and geographical distribution of three taxa of the genus *Armenia* DUBATOLOV and KORSHUNOV, 1984 : *ledereri* BOISDUVAL, *hyrcanica* RILEY and *cyri* NEKRUTENKO is revised. Recent works dealing with these taxa are reviewed. Two species are recognized : *ledereri* and *hyrcanica*. The taxon *cyri* is a junior objective synonym of the species *hyrcanica*, but is considered to be valid subspecies.

Zusammenfassung

Die Taxa der Gattung *Armenia* DUBATOLOV and KORSHUNOV, 1984 *ledereri* (BOISDUVAL), *hyrcanica* (RILEY) and *cyri* (NEKRUTENKO) werden miteinander taxonomisch verglichen und ihre geographische Verbreitung wird aufgezeigt. Diese Taxa gehören zu zwei Arten : *ledereri* und *hyrcanica*. Das Taxon *cyri* ist im Speziesrang als jüngeres Synonym zu *hyrcanica* zu betrachten und hat nur subspezifische Gültigkeit. Die neuere Literatur, die diese Taxa behandelt, wird hier kurz zusammengefaßt.

TAXONOMIC STUDIES

The taxon *ledereri* was described by BOISDUVAL (1848) from the foothills of the Caucasus. A more detailed description and figure was given by NORDMANN (1851). In 1939 RILEY described a new subspecies *Strymon ledereri hyrcanica* from "North-East Persia" with a wide distribution, reaching from Armenia to the Hissar Range in Central Asia. In 1974 a new subspecies : *Fixsenia ledereri nazeri* was described by LARSEN from the Lebanon and in 1978 SAKAI recorded *ledereri* for the first time from Afghanistan. In the same year NEKRUTENKO described a new subspecies from the basin of the Kura River in Azerbaidjan, *Pseudothecla ledereri cyri* (NEKRUTENKO, 1978a). Due to the sympatric occurrence of the taxa *P. ledereri ledereri* and *P. ledereri cyri* in the territory of Erivan (USSR, Armenia) he recognized the validity of two independent species (NEKRUTENKO, 1978b). This separation was published 4 years later (NEKRUTENKO *et al.* 1982). In 1980 ECKWEILER and HOFMANN published a check-list of Iranian Rhopalocera which included *Fixsenia*

hyrcanica hyrcanica from Elbours. The latest contribution to the systematics of this group of species was a work by STSHETKIN (1984) where two new subspecies from Pamiro-Alai, *Pseudothecla cyri badachshanica* and *P. cyri seravshanica* were described.

Over the years, the taxon *ledereri* has been combined with the genera *Lycaena* (BOISDUVAL, 1848), *Argus* (GERHARD, 1850), *Bakeria* (TUTT, 1907), *Thecla* (SEITZ, 1909), *Strymon* (RILEY, 1939), *Pseudothecla* (KORSHUNOV, 1972 ; NEKRUTENKO, 1978a), *Fixsenia* (LARSEN, 1974 ; SAKAI, 1978) and *Satyrium* (CLENCH, 1978). Recently DUBATOLOV and KORSHUNOV (1984) thought it desirable to replace the invalid generic names *Argus* and *Bakeria* (with type-species *ledereri*) by *Armenia*.

There is no doubt of the existence of at least two different species in the *ledereri-hyrcanica-cyri* complex, because of the sympatric occurrence of two of them in Armenia. These two species can be easily distinguished by the size and arrangement of the postdiscal spots on the underside of the wings (Fig. 2). There are also differences in the colour of both, the under- and uppersides of the wings and in the wingspan ; the male genitalia are similar in both species.

The problem was to clarify the taxonomic position of ssp. *hyrcanica*. From RILEY's description, which was not accompanied by an illustration, the systematic position of ssp. *hyrcanica* is not clear. By the courtesy of the British Museum (Natural History), London (BMNH) we have received photographs of both the holotype and allotype of *Strymon ledereri hyrcanica* RILEY. Comparing them with the description and illustrations of the types of *Pseudothecla cyri* NEKRUTENKO, 1978, we found these two taxa to be conspecific (Fig. 1). The name *hyrcanica* has priority over *cyri*.

Fig. 1. Undersides of a) *A. hyrcanica hyrcanica* (RILEY), male holotype, N. Persia, 1906 (specimen is in the collection of BMNH) ; b) *A. hyrcanica cyri* (NEKRUTENKO), male, USSR, Armenia, Erivan, Mur-Marash, June 17, 1973, leg. Z. WEIDENHOFFER ; c) *A. ledereri ledereri* (BOISDUVAL), male, USSR, Georgia, Tbilisi, Cherepashie Ozero, June 6, 1972, leg. Z. WEIDENHOFFER.

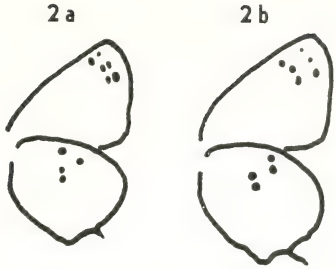

Fig. 2. Diagrams to highlight the differences in underside markings between a) *A. hyrcanica* (RILEY) and b) *A. ledereri* (BOISDUVAL).

The systematic position of the taxa within the genus *Armenia* is now considered to be as follows :

Armenia DUBATOLOV & KORSHUNOV, 1984

1. Armenia ledereri (BOISDUVAL, 1848) in DUBATOLOV & KORSHUNOV, 1984.
   = *Lycaena ledereri* BOISDUVAL in BOISDUVAL, 1948.
   = *Argus ledereri* BOISDUVAL in GERHARD, 1850.
   = *Bakeria ledereri* BOISDUVAL in TUTT, 1907.
   = *Thecla ledereri* BOISDUVAL in SEITZ, 1909.
   = *Pseudothecla ledereri* BOISDUVAL in KORSHUNOV, 1972.
   = *Fixsenia ledereri* BOISDUVAL in LARSEN, 1974.
   = *Satyrium ledereri* BOISDUVAL in CLENCH, 1978.

1a. A. ledereri ledereri (BOISDUVAL, 1848).
1b. A. ledereri nazeri (LARSEN, 1974).
   = *Fixsenia ledereri nazeri* LARSEN in LARSEN, 1974.

2. Armenia hyrcanica (RILEY, 1939), **rev. stat., comb. n.**
   = *Strymon ledereri hyrcanica* RILEY in RILEY, 1939.
   = *Fixsenia ledereri* BOISDUVAL in SAKAI, 1978.
   = *Fixsenia hyrcanica* RILEY in ECKWEILER & HOFMANN, 1980.
   = *Pseudothecla cyri* NEKRUTENKO in NEKRUTENKO *et al.* 1982.

2a. A. hyrcanica hyrcanica (RILEY, 1939), **comb. n.**
   = *Strymon ledereri hyrcanica* RILEY in RILEY, 1939.
   = *Fixsenia hyrcanica hyrcanica* RILEY in ECKWEILER & HOFMAN, 1980.

2b. A. hyrcanica cyri (NEKRUTENKO, 1978), **comb. n.**
= *Pseudothecla ledereri cyri* NEKRUTENKO in NEKRUTENKO, 1978a.
= *Pseudothecla cyri cyri* NEKRUTENKO in NEKRUTENKO *et al.* 1982.

2c. A. hyrcanica badachshanica (STSHETKIN, 1984), **comb. n.**
= *Pseudothecla cyri badachshanica* STSHETKIN in STSHETKIN, 1984.

2d. A. hyrcanica seravshanica (STSHETKIN, 1984), **comb. n.**
= *Pseudothecla cyri seravshanica* STSHETKIN in STSHETKIN, 1984.

DISTRIBUTION (Fig. 3)

Armenia ledereri seems to be of Syrian-Armenian origin. Its distribution covers Lebanon (LARSEN, 1974), East and South Turkey (HIGGINS, 1966), the foothills of Caucasus (RILEY, 1939) and Transcaucasia (NORDMANN, 1851 ; NEKRUTENKO, 1978). There are no records from Syria or Iraq.

Armenia hyrcanica has a wider distribution than *ledereri.* It extends from Transcaucasia (RILEY, 1939 ; ECKWEILER & HOFMANN, 1980) to the mountains of Central Asia, where it was recorded from the Hissar Range (RILEY, 1939), Zeravshanskiy Range and West Pamir (STSHETKIN, 1984), and Afghanistan, from the Tera Pass (SAKAI, 1978 ; 1981). The record from Afghanistan was published as *ledereri,* but photographs in both works clearly show that this specimen is *hyrcanica.*

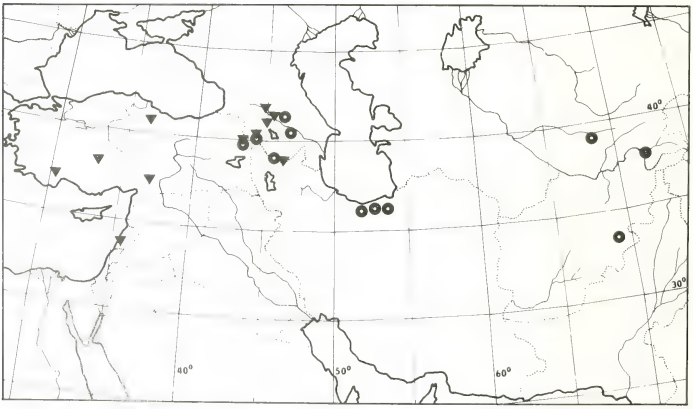

Fig. 3. Distribution map of *A. ledereri* (BOISDUVAL) (triangles) and *A. hyrcanica* (RILEY) (circles).

The authors of this paper found both species occurring sympatrically in Transcaucasia : WEIDENHOFFER in Armenian Erivan (Nor-Marash), ECKWEILER on the Turkish side of the valley of Araxes, near Akçay, district of Kağizman. At these localities both species fly together, their flight periods partially overlapping. The adults of *ledereri* emerge from the end of May until the beginning of July. *Armenia hyrcanica* appears about 3 weeks later, in the second half of June in Erivan and at the beginning of July in Akçay, with a peak in July.

Altogether, 6 subspecies have been described for the two species :

A. ledereri ssp. *ledereri* (BOISDUVAL), TL : not stated (foothill of Caucasus) ;
A. ledereri ssp. *nazeri* (LARSEN), TL : Lebanon, Jabal Kasrouan ;
A. hyrcanica ssp. *hyrcanica* (RILEY), TL : not stated (North-East Persia) ;
A. hyrcanica ssp. *cyri* (NEKRUTENKO), TL : USSR, Azerbaidjan, Khanlar district, Yenikend village ;
A. hyrcanica ssp. *badachshanica* (STSHETKIN), TL : USSR, West Pamir, Shugnanskiy Range, Khorog ;
A. hyrcanica ssp. *seravshanica* (STSHETKIN), TL : USSR, Zeravshanskiy Range, Iskander-Kul Lake.

Conclusions

It is shown that RILEY's taxon *Strymon ledereri* ssp. *hyrcanica* is an independent species easily distinguishable from *ledereri*. The recently introduced name *cyri* for this species is a junior objective synonym of *hyrcanica*, but it is retained as a valid subspecies. The two species have different, but overlapping distributions, *Armenia ledereri* extending from Armenia to Lebanon and *A. hyrcanica* from Armenia to Central Asia. Both species are rather inconspicuous and are easily overlooked unless one is searching for them. It is probable that both species are much more widely distributed than current records indicate. The overlapping area of distribution includes West Azerbaidjan, East Georgia, South and East Armenia, Nakhitshevan, East Turkey and probably also North-West Iran.

Acknowledgement

The authors wish to record their gratitude to P. R. ACKERY, British Museum (Natural History) London, for kindly supplying the photographs of the types of *hyrcanica*.

References

BOISDUVAL, J. B. A., 1848. Aux Lépidoptères recueillis par M. KINDERMANN aux environs d'Odessa et au pied du Caucase. *Annls Soc. ent. Fr.* (1848) 6 : XXVIII-XXX.

CLENCH, H. K., 1978. The names of certain holarctic hairstreak genera (Lycaenidae). *J. Lepid. Soc.* 32 (4) : 277-281.

DUBATOLOV, V. V., KORSHUNOV, J. P., 1984. New data on taxonomy of the butterflies of the USSR. Chlenistonogie i gel'minty, Sibir. Otdel. Ak. Nauk USSR, Novosibirsk, pp. 51-57.

ECKWEILER, W., HOFMANN, P., 1980. Verzeichnis iranischer Tagfalter. *Nachr. ent. Ver. Apollo*, Frankfurt a. M., Suppl. 1, p. 15.

GERHARD, B., [1850]-[1853]. Versuch einer Monographie der europäischen Schmetterlingsarten : *Thecla, Polyomattus* [sic !], *Lycaena, Nemeobius*, Hamburg, pp. 1-21, 39 Kolor. Taf.

HIGGINS, L. G., 1966. Check-list of Turkish butterflies. *Entomologist* 99 : 209-222.

KORSHUNOV, J. P., 1972. Catalogue of diurnal butterflies (Lepidoptera, Rhopalocera) of the fauna of the USSR, II. *Entom. Obozr.* 51 : 352-368 (in Russian). For English version see *Entomological Review* 1972 : 212-223.

LARSEN, T. B., 1974. Une espèce et deux sous-espèces nouvelles de Lycaenidae du Liban. *Alexanor*, 8 : 301-307, 3 fig.

NEKRUTENKO, Yu. P., 1978a. Two new subspecies of the Lycaenid butterfly subfamily Strymoninae. *Dokl. Akad. Nauk USSR*, ser. B, Nr. 1, pp. 82-86.

NEKRUTENKO, Yu. P., 1978b. Personal communication.

NEKRUTENKO, Yu. P., KORSHUNOV, J. P., EFFENDI, R. M. E., 1982. Critical remarks to the fauna and systematics of diurnal butterflies of Transcaucasia. *Vestnik Zool. Kiev*, Nr. 3 : 38-43.

NORDMANN, A., 1851. Die im Gebiete der Fauna Tauro-caucasica beobachteten Schmetterlinge. *Bull. Soc. Imp. Nat. Moscou* 24 (2) : 395-428.

RILEY, N. D., 1939. Notes on oriental Theclinae (Lep. Lycaenidae) with descriptions of new species. *Novitates Zoologicae* 41 : 355-361.

SAKAI, S., 1978. Butterflies from the Hindukush, Karakorum, Kashmir and Ladak, with descriptions of two new species and six subspecies. *Atalanta* 9 (1) : 104-132, 68 fig.

SAKAI, S., 1981. Butterflies of Afghanistan, pp. 242, pl. 46, figs 2.

SEITZ, A., 1909. Die Groß-Schmetterlinge der Erde I, 1, pp. 268.

STSHETKIN, Yu. Yu., 1984. Two new subspecies of *Pseudothecla cyri. Zool. Zhurnal, Moscow* 63 (9) : 1430-1432.

TUTT, J. W., [1907]. A Natural History of British Lepidoptera, London, Vol. 9, p. 142.

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Book reviews — Buchbesprechungen — Analyses

GONSETH, Yves : Atlas de distribution des Papillons diurnes de Suisse (Lepidoptera Rhopalocera). Documenta Faunistica Helvetiae 5 ; 242 pp., *and* Verbreitungsatlas der Tagfalter der Schweiz (Lepidoptera Rhopalocera). Documenta Faunistica Helvetiae 6 ; 242 S. Centres Suisse de cartographie de la faune, Neuchâtel (CSCF) and Schweizerischer Bund für Naturschutz, Basel (SBN), 1987. Paperback ; price, each volume SFr. 25. Orders : Musée d'histoire naturelle, Terreaux 14, CH-2000 Neuchâtel.

In 1983, the SBN (Swiss Society for Nature Conservation) initiated a project aimed at the protection of the Swiss butterfly fauna. All Swiss lepidopterists were asked to send in records and information to provide a basis for proposing suitable protection measures. In 1985, the CSCF (Swiss centre for faunistic records) was set up to store and analyse all faunistic data, primarily however on the Rhopalocera and Odonata. In 1986, the centre introduced the series 'Documenta Faunistica Helvetiae' with a booklet describing the methods used and a first faunistic work, on the Tipulidae (Diptera) of Switzerland (both in French). The Odonata and Rhopalocera followed (in both French and German) in 1987. The German editions were translated from the original French.

After a short introduction explaining the methods and presentation used, the distribution of each species (one per page), both within Switzerland and in Europe, is shortly discussed. Distribution maps based on squares of 5 km are given for all 198 resident and migrant species, except for *Erebia sudetica* STGR., *E. nivalis* LORK., *Coenonympha oedippus* F., *Maculinea teleius* BERGSTR. and *M. nausithous* BERGSTR. Data is split into pre 1970 (open squares with cross-line) and post 1970 (closed squares). Bargraphs are also goiven for the phenology and temperature dependence of each species. The book is completed by a 'red list', a table summarizing what needs to be done, how and by whom, to protect the Swiss butterfly fauna, a systematic list of species, a list of recorders, a species index, and a list of doubtful records.

The book is based on 64717 records obtained from the literature (39%), museum collections (21%) and individual recorders (40%). Some of these records would suggest that a more stringent control of the data may be necessary. However, a good idea as to the general distribution of each species is given although much more information for the post 1970 period is required. The estimated status of each species may have to be modified when more information is received. At present, no species are considered to have become extinct, although 19 (10%) are thought to be on the verge of extinction and a further 43 (22%) are threatened.

Altogether, this book makes a very good impression and it clearly shows that the CSCF has started on a sound footing. The book will be useful for all students of the European butterfly fauna, and should inspire them to pass on their own Swiss records.

This volume is intended to complement another book published at the same time by the SBN : 'Tagfalter und ihre Lebensräume' ('Butterflies and their habitats'), which will be reviewed in *Nota* at a later date. Both publications are examples of how well amateur and professional lepidopterists can work together with conservationists.

S. E. Whitebread

VIème Congrès Européen de Lépidoptérologie
San Remo 5-9 avril 1988

La Societas Europaea Lepidopterologica (SEL) invite cordialement tous les lépidoptéristes à participer au VIème Congrès Européen de Lépidoptérologie qui aura lieu à San Remo du mardi 5 au samedi 9 avril 1988.

Les thèmes centraux sont les suivants :

- Adaptation biochimique et écologique chez les Lépidoptères.
- Bionomie des espèces menacées.
- Recherche génétique et cladistique sur la phylogénie des Lépidoptères.

Pour plus de renseignements, veuillez consulter le Secrétaire des Congrès : Prof. E. Balletto, Dipartimento di Biologia animale, Via Academia Albertina 17, I-10123 Torino (Italie).

Memorandum

Einem von Mitgliedern vielfach geäusserten Wunsch folgend liegt dieser Nummer eine Rechnung für den Mitgliederbeitrag für das Jahr 1988 bei. Sie richtet sich nur an die Ordentlichen Mitglieder. Korporative Mitglieder erhalten wie bisher im Januar vom Schatzmeister eine gesonderte Rechnung. Ebenso sind die in der Bundesrepublik Deutschland über eine Einzugsermächtigung zahlenden Mitglieder nicht angesprochen. Wenn notwendig, bitten wir, die eigene Anschrift oben links selber einzutragen.

Wir erinnern daran, dass der Beitrag bis spätestens zum 31. März zu leisten ist. Bis zu diesem Tag eingehende Zahlungen des vollen Betrags werden vom Schatzmeister durch Zusenden der Mitgliederkarte bestätigt. Durch Bankgebühren entstehende Abzüge werden in Rechnung gestellt.

Memorandum

At the request of several members, an invoice for the annual subscription due 1st January 1988 is enclosed with this issue. It is intended for ordinary members only. Corporate members will receive a separate invoice from the treasurer as usual in January.

We remind members that the subscription fee should be paid at the latest by the 31st March. A membership card will be sent to all members whose subscription is received by this date. If the full amount is not received by the treasurer, due to bank charges, the difference will be invoiced.

Memorandum

Pour répondre à la demande de nombreux membres, le présent numéro contient une facture pour la cotisation de 1988. Elle ne concerne que les membres ordinaires. Les membres corporatifs recevront comme jusqu'ici une facture distincte du trésorier.

Nous rappelons à nos membres que la cotisation doit être payée avant le 31 mars au plus tard. Le trésorier accusera réception des paiements complets reçus avant cette date par l'envoi de la carte de membre. Les déductions éventuelles effectuées par les banques (commissions) seront facturées.

Please note that the Society's Post Office account number has been quoted incorrectly on the inside back cover of *Nota lepid.* since vol. 9 (3/4). The correct number is Cologne 1956 50-507. We apologize for any inconvenience this may have caused.

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Contents – Inhalt – Sommaire

Scientific Communications – Original Arbeiten – Travaux originales

	No.	P.
BALDIZZONE, G. Contributions à la connaissance des Coleophoridae XLVI. Sur quelques Coléophores nouvelles ou peu connues d'Espagne et des Canaries	1	25
BALINT, Z. Notes on *Plebicula dorylas magna* BALINT, 1985 (Lycaenidae)	1	49
CAMERON-CURRY, V., G. LEIGHEB, E. RIBONI & P. CAMERON-CURRY. Possible hybrids between *Lysandra bellargus* ROTT. and *L. hispana* H.-S. (Lycaenidae)	1	61
COENE, H. A. Cf. VIS, R.		
DENNIS, L. H. Hilltopping as a mate location strategy in a Mediterranean population of *Lasiommata megera* (L.) (Satyridae)	1	65
DERRA, G. *Emmelina jezonica pseudojezonica* ssp. nov. (Pterophoridae)	1	71
DUBATOLOV, V. V. Cf. SCHINTLMEISTER, A.		
ECKWEILER, W. Cf. WEIDENHOFFER, Z.		
FERNANDEZ HAEGER, J. Cf. JORDANO BARBUDO, D.		
DE FREINA, J. J. Eine neu entdeckte Lymantriiden-Art aus Kaschmir : *Arctornis kohistana* sp. n.	2	119
GAEDIKE, R. Beitrag zur Kenntnis der paläarktischen Douglasiidae : *Tinagma klimeschi* sp. n. aus Rhodos	3	158
GROTENFELT, P. Cf. MIKKOLA, K.		
GYULAI, P. Notes on the distribution of *Gortyna borelii lunata* FREYER in the Carpathian Basin (Noctuidae)	1	54
HERRMANN, R. *Dahlica marmorella* sp. n. – eine neue Psychide aus Italien	4	203
HESSELBARTH, G. Morphologische und ökologische Daten zu den präimaginalen Stadien einiger Arten der Gattung *Hyponephele* MUSCHAMP, 1915 (Satyrudae)	4	209
JORDANO BARBUDO, D., J. RODRIGUEZ GONZALEZ & J. FERNANDEZ HAEGER. *Capparis spinosa* (Capparidaceae) : an oviposition sub-		

strate for *Lampides boeticus* LINNAEUS in southern Spain (Lycaenidae) 4 218
LAFONTAINE, J. D. Cf. MIKKOLA, K.
LEIGHEB, G. Cf. CAMERON-CURRY, V.
LÖDL, M. *Noctua warreni* sp. n., a new sibling species of *Noctua comes* HÜBNER, 1813 from Cyprus (Noctuidae) 3 163
MAES, K. V. N. Revisionary notes on the genus *Achyra* GUENÉE with a new synonym and the description of *Achyra takowensis* sp. n. (Studies on Pyralidae I) 3 175
MIKKOLA, K. Biography of Prof. ESKO SUOMALAINEN, Honorary member of SEL 2 113
MIKKOLA, K., J. D. LAFONTAINE & P. GROTENFELT. A revision of the holarctic *Chersotis andereggii* complex (Noctuidae) 3 140
POVOLNY, D. *Scrobipalpa (Euscrobipalpa) dagmaris* sp. n. und andere interessante Entdeckungen bei den europäischen Gnorimoschemini (Gelechiidae) 1 79
RAMMERT, U. The defensive biology of the larvae of *Amata (= Syntomis) phegea* L. and *Amata (= Syntomis) kuhlweinii* LEF. (Ctenuchidae) 3 183
RAZOWSKI, J. A New Palaearctic Archipini genus (Tortricidae) 1 87
RAZOWSKI, J. On the family-level systematics of the Pterophoridae .. 2 127
RIBONI, E. Cf. CAMERON-CURRY, V.
RODRIGUEZ GONZALEZ, J. Cf. JORDANO BARBUDO, D.
SAITOH, K. A note on the haploid chromosome number of *Brenthis ino* ROTTEMBURG 1775 from Finland (Nymphalidae) 2 131
SATTLER, K. The systematic status of the genera *Ilseopsis* POVOLNÝ 1965 and *Empista* POVOLNÝ, 1968 (Gelechiidae) 4 224
SCHINTLMEISTER, A., V. V. DUBATOLOV, A. V. SVIRIDOV, A. Yu. TSHISTJAKOV & J. VIIDALEPP. Verzeichnis und Verbreitung der Notodontidae der UdSSR 2 94
SUOMALAINEN, E. Autobibliography (Lepidopterological publications) 2 115
SVIRIDOV, A. V. Cf. SCHINTLMEISTER, A.
TREMEWAN, W. G. The problem of infrasubspecific names in some groups of Lepidoptera 4 236
TSHISTJAKOV, A. Yu. Cf. SCHINTLMEISTER, A.
VIIDALEPP, J. Cf. SCHINTLMEISTER, A.
VIS, R. & H. A. COENE. Lepidopterological investigations in Kashmir and Ladakh (India) 1 5
WEIDENHOFFER, Z. & W. ECKWEILER. Notes on the status of *Armenia hyrcanica* (RILEY, 1939) (Lycaenidae) 4 241

Obituary – Nachruf – In Memoriam

Jorma KYRKI, 1950-1986 (E. M. LAASONEN) 3 138
John HEATH, 1922-1987 (B. GOATER) 4 200

Book reviews – Buchbesprechungen – Analyses 1 53, 60, 70, 92
2 133, 134, 136
3 193, 194, 195
4 247

Editorial 1 2
4 198

Sixth European Congress of Lepidopterology. San Remo 5-9 April 1988 ..... 2 93
4 202, 217, 248

Communication 1 4
2 112

Corrigendum 4 223

Memorandum 4 249

New Taxa described in Vol. 10
Neue Taxa in Vol. 10 beschrieben
Nouveaux taxa décrits dans le Vol. 10

PSYCHIDAE	*Dahlica marmorella* HERRMANN	204
COLEOPHORIDAE	*Coleophora aliena* BALDIZZONE	26
	Coleophora beticella BALDIZZONE	32
	Coleophora jynxella BALDIZZONE	29
	Coleophora sciurella BALDIZZONE	33
	Coleophora vivesella BALDIZZONE	27
	Coleophora teneriffella BALDIZZONE	30
GELECHIIDAE	*Scrobipalpa (Euscrobipalpa) dagmaris* POVOLNY ..	80
DOUGLASIIDAE	*Tinagma klimeschi* GAEDIKE	158
TORTRICIDAE	*Tosirips* RAZOWSKI	87
PYRALIDAE	*Achyra takowensis* MAES	178
PTEROPHORIDAE	*Emmelina jezonica pseudojezonica* DERRA	71
LYMANTRIIDAE	*Arctornis kohistana* DE FREINA	119
NOCTUIDAE	*Chersotis andereggii arcana* MIKKOLA	151
	Noctua warreni LÖDL	164

Contents – Inhalt – Sommaire 250

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